approach

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THE NAVAL AVIATION SAFETY REVIEW

MARCH 1957

The Chief—
a priceless combination of training and experience, offers admirable advice towards improved aviation safety . . .

See inside front cover.

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No. 9

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IN TS

— COVER —

Cover by Lt. E. T. Wilbur

Introducing *The Chief:*

If the face on the cover seems curiously familiar, it was so intended. Artist Ted Wilbur, we think, has successfully portrayed THE Navy chief—that original "old hand"—the man who, perhaps more than any other individual, possesses the priceless combination of training and experience.

As any CO will gratefully attest, The Chief comprises a major source of information-when-you-need-it.

For this reason, The Chief has been properly regarded as the most reliable medium for translating ideas into action. The "Erection and Maintenance Manual" is his bible, and "Standard Operating Procedures" is his testament.

So armed, and with an enviable understanding of human nature, The Chief is a unrelenting force against the evils of poor maintenance. From the unquestioned fortress of his experience, The Chief wages an unending war with poor availability and the myriad problems of manpower, supply and the demands of operational commitments.

With a magic mixture of ideal procedures and realistic initiative, he manages to convert "Can Do" to "Mission Accomplished," and woe betide the character who dopes off or does the job improperly. That luckless individual will learn, in the marvelous vocabulary possessed only by chiefs, of the price of his erring ways.

Because the pungent wisdom and the shrewd perception of The Chief has long been a necessary part of the Navy tradition, *Approach* considers that naval aviation offers no better source of the basic truths of accident prevention than the triple distilled comments of The Chief. Therefore, from time to time we will share with you via *Approach* and appropriate posters his admirable advice on things which make for improved aviation safety.

And as The Chief himself probably said first: "Learn from the mistakes of others—you won't live long enough to make them all yourself".

Tech

Letters to the Editor

Sir:

I am enclosing as a matter of interest an article which appeared in the Oslo "Afterposten" on 6 October 1956 entitled "Ten Years Airborne in the Far North Without a Single Accident." The undersigned served two years in Norway as assistant U. S. Naval Attache and flew on a number of occasions with the Norseman Wing at the Skattora seaplane station at Tramso which has now been operating for 10 years as a branch of the Norwegian Air Force. One notable indication of their remarkable safety record is the wing's flying methods in bad weather; they may fly in bad weather; but they fly under it, and not through it.

HAMILTON LAWRENCE
Colonel, USMC

Gratulene to Captain Hans Peter Grannaes and his crew at Skattora for a fine safety record—from all of us in American naval aviation. We're pleased to know that safety is a prime concern of aviation units the world over.—Ed.

Sir:

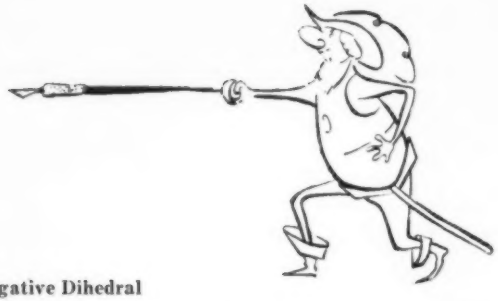
Enclosed you'll find an article we ran in the "Moffett News." [See photo page 34.] This precipitated a larger cleanup which produced two pickup loads of junk from off the runways and taxiways. Maybe this little blurb saved some money. The two large photographs are the junk that was collected. Now here comes the pitch. These areas are swept down with a fiber broomed sweeper and this sure proves its inadequacy. A vacuum sweeper is what is really needed.

In the meantime we are using the shoulder-to-shoulder walk through system and it is evidently paying off for we've had no foreign object damage to our engines. This is awkward and time-consuming especially if a sweeper is used and can't be trusted. My recommendation is to get a vacuum sweeper or build engines that can digest this junk.

EDWARD H. ALBRIGHT
VF-53 Ops Dept

Good work. NASC recently recommended that BuAer consider a huge truck-borne vacuum sweeper. —Please see "Jetsam," page 32.—Ed.

More on next page



Re: Positive/Negative Dihedral

Sir:

Reference your "A Body At Rest" in November *Approach* . . . You say "If you find a straight-wing with negative dihedral send us a wire because somebody at the factory made a mistake." How about the F-104, or don't these laws apply

Why "grown men cry . . ."

to the Air Force, or maybe they like to climb out on their back or something? Anyway, I thought I'd let you tell Lockheed as I hate to see grown men cry. I've held this letter up a week while trying to confirm my suspicions that the F-104 has cathedral, but I've been unable to find a front or rear view . . . in the event that I'm all wet, pretty please, disregard.

H. L. MERTON, Lt., USNR
FAWTUPac, Air Defense Div

(For comment from the grown men of Lockheed and elsewhere, see below—Ed.)

Sir:

Many thanks for giving us an opportunity to "sound off" . . . about the article . . . It sure looks like the author . . . has firm convictions . . . i.e., "the airplane would have lateral instability but completely . . . such a beast is not supposed to exist . . ."

I'm sending . . . a question and answer sheet I worked up with Kelly Johnson at the time of the F-104's unveiling last spring:

Q.—Why is there negative dihedral (or cathedral) in the wing?

A.—This stems from the combined effects of having a wing that extends only 8 feet from the fuselage and a tail fin that reaches almost the same distance in a vertical direction. Because the vertical tail had the span of a wing, the deflection of the rudder acted like an aileron. To compensate for the roll you get from the vertical, we put the negative dihedral in the wing.

"Whoever wrote the original statement," Mr. Johnson adds for *Approach* "does not appreciate that you can get dihedral effect . . . even with the wings drooped down 10 degrees, as in the F-104. With the wings straight, we had excessive dihedral effect, due primarily to the vertical tail acting to give us roll with yaw . . . to compensate for this, we put the negative dihedral on the 104."

GROVER D. NOBLES, JR.
Newsbureau, Public Relations Department
Lockheed Aircraft Corporation

(See also below—Ed.)

Sir:

. . . "A Body At Rest" . . . was in general a good presentation on airplane stability in a language most pilots can understand. The author, however, got "out of bounds" in his discussion of lateral stability . . . airplane dihedral is not solely a function of the dihedral of the wing.

An airplane with straight wings and negative dihedral will not necessarily roll over on its back as soon as it becomes airborne. The F-104 . . . has straight wings with 10 degrees negative dihedral. This raises the center of pressure on the vertical fin which provides the equivalent of 15 degrees to 20 degrees of positive dihedral angle. Negative dihedral was introduced in the wing to reduce the net positive dihedral effect to that equivalent to 5 degrees to 10 degrees of positive dihedral angle.

L. HEYWORTH, JR., Comdr.,
V. R. HANCOCK, Lt.,
Flight Test Division, NATC, Patuxent

Our thanks, in turn, to Lt. Merton for his sharp-eyed salvo; to Mr. Nobles of Lockheed for the prompt reply furnished our query by Mr. Kelly Johnson, vice president of Engineering and Research, L.A.C., and for their comment on the puzzler, equal appreciation is expressed to Comdr. Heyworth and Lt. Hancock of Pax, whose remarks provided the missing portion of the picture.

In the absence of the author of the article, (who is presently carqualing and doubtless busy with his own problems of stability), we writer types can only cower in confusion behind our Underwoods and paraphrase the old one about "When is a hole not a hole?—When it's a knothole" into: "When is negative dihedral not negative?—When its end effect is positive."—Ed.

Sir:

Re: Minimizing Foreign Object Damage to J-65 engines.

. . . When the J-65 engine is installed in the FJ-3 there is a small opening between the lower side of the compressor case and the forward fuselage section. When a reverse flow of air occurs through this opening small objects such as safety wire, small nuts and bolts . . . . are drawn forward and into the compressor.

These items have a bad habit of being dropped into the engine bay when men are working in such places as the oil filler access door, battery compartment and any other access door on the sides or upper part of the fuselage.

After a rash of foreign object damages in July we decided something had to be done, so all aircraft were grounded, the engines removed and a large capacity vacuum cleaner, which FASRon-10 had in stock, was used to thoroughly clean the bottom of the fuselage; paying particular attention to sharp corners made by structure ribs and formers.

At any time the engine is removed from an aircraft this vacuuming process is repeated. An in-

tensive indoctrination program was initiated for all men doing work on installed engines and accessories to prevent dropping of loose odds and ends into the engine compartment.

Also we continue to have weekly shoulder-to-shoulder policing of the ramp and stressing to all personnel the need for picking up any objects found lying around the parking area.

Since July 1956 we have had only one engine change due to foreign object damage.

BILL PILCHER
Capt. USAF
Safety Officer VF-191

Thanks, Bill, and kudos to VF-191 for the first real evidence of a system that's paying off. For more on this subject, please read "Jetsam," beginning on page 32.—Ed.

Sir:

In regards to two articles under Truth and Consequences (Page 8) in the January issue of the *Approach*, many of the TV pilots here do not go along with all that is said.

The first item ("Unexpected Ride"): Pulling all of the pins after turning onto the duty runway is almost an impossibility in the 141 series (latest type) TV. Some individuals with long arms might be able to do it, but it is really going to delay launches if each TV taking the duty pulls the 10 pins prior to takeoff.

Next item: The following article ("Cockpit Fumes") states that "any combination of the following actions would have corrected the discharge of fuel:

(1) closing the defrost control valve,
(2) turning off the tip-tank pressurization,
(3) increasing the engine speed to 100 percent,
(4) closing the cabin pressurization vents, and
(5) dumping the cabin pressure.

Of all of the above, only the last item would have had much effect on the immediate problem. Closing the defrost control valve would have stopped the spray of fuel in the pilots face, but would not have prevented it from coming into the cockpit from the lower vents. Turning the pressurization OFF would have eventually helped—but it could take as much as 30 minutes. Increasing the engine speed to 100 percent should only increase the flow, unless something else not covered was involved. In addition to closing the cabin pressurization vents and dumping the pressure, opening the ram air vent is advisable.

The best possible solution, however, wasn't even mentioned. Dropping the tips, which he eventually did anyway, would have eliminated the problem completely.

FAWTULant Det. B
NAS Oceana

You're right!—in the 141 series pulling the pins while strapped in is almost an impossibility. On the cockpit fumes item, Approach *reported the findings of the AAR board. They have been notified of these comments. To avoid such occurrences,* Approach *copy is normally reviewed extensively by major Center departments. However, somehow these items slipped through. Additional steps have been taken to avoid a repetition. Thanks again for calling these points to our attention.—Ed.*

P.S.—Safety officers please note these corrections in your file copy.

Sir:

I would like permission to reprint the article "Down Collective" from your September issue in "Flight Deck," the official quarterly magazine of the Fleet Air Arm. The article would of course be featured under the author's name and I would add an acknowledgement to *Approach*.

M. D. R. HALL
Editor, "Flight Deck"
London

Letters may be forwarded either via official channels or direct on Anymouse forms. All letters should be signed, names are withheld on request. Address Approach Editor, U. S. Naval Aviation Safety Center, NAS Norfolk 11, Virginia.

Sir:

Re January *Approach* on wheelsup accidents; I have noted that NAAS El Centro has an excellent portable enclosure for the wheel watch. I recommend that such an enclosure be used to protect the wheel watch from the elements. He should have flare pistol(s) at his disposal, and his radio set should be maintained at the same frequency as the landing aircraft . . .

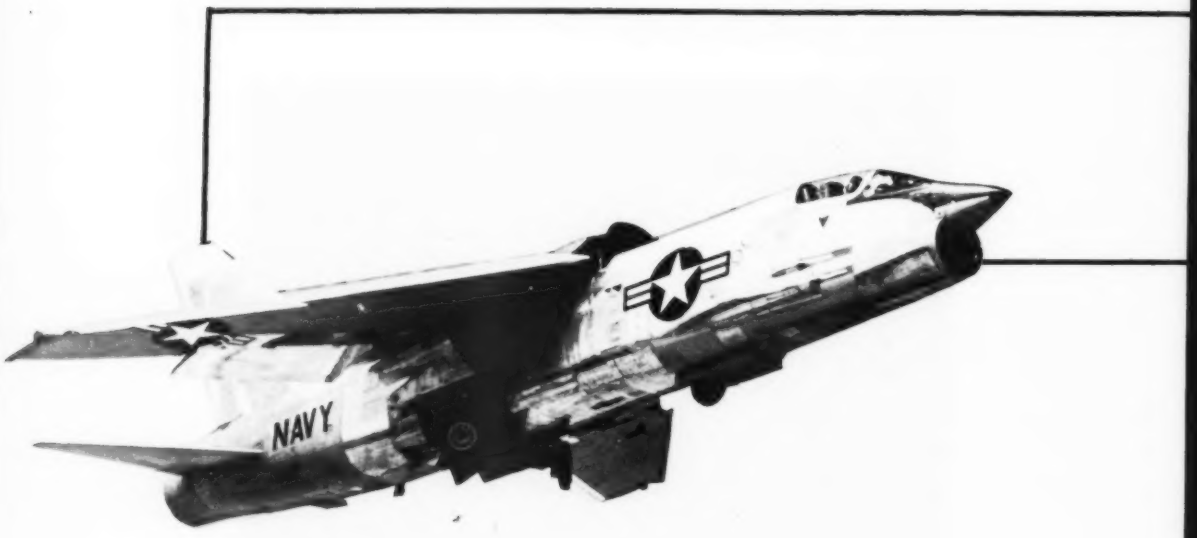
The wheel watch should be a rated man—as is now being done at NAS Miramar. In our squadron all new wheel watch personnel are interviewed personally by the C.O. or X.O. At this time the importance of the job is explained . . .

This squadron feels strongly concerning the importance of the wheel watch, particularly after one of our pilots failed to lower gear at night. The wheel watch was posted, but because he "doped off" the pilot received a broken back (grounded for 6 months).

X.O.
VA Squadron

See El Centro's wheel watch enclosure below. Your recommendations were, in the main, contained in the February Approach *article "See It Now," discussing the wheelsup problem. For the record, your letter and details on El Centro's truck have been sent to BuAer.—Ed.*

El Centro's mobile runway control tower provides shelter for "Wheels."



When new airplanes, such as the F8U-1 *Crusader,* begin to appear in the fleet the questions fly thick and fast.

How fast will it go? How high? How far? How does it handle in the landing pattern? Will it turn at altitude? What are its high mach characteristics? These questions and many others are being asked in readyrooms throughout the Navy. The answers to questions about the *Crusader* have been found in nearly two years of intensive flight testing by Navy and contractor pilots.

We think we now know the airplane's secrets and that it is fit and ready for fleet use. The intent of this article is to share information concerning the *Crusader's* takeoff and landing characteristics and how to handle it best during these phases.

flying the crusader

by L. J. WALTON
Chance Vought Test Pilot

TAKEOFF differs little from that of other contemporary jet fighters except that the wing, raised for takeoff, must be lowered to the cruise configuration after becoming airborne.

The two-position, variable incidence wing, the *Crusader's* most striking design feature, contributes the important advantages of improved visibility and increased stability at lower speeds. This is accomplished by keeping the fuselage angle flat with an increase of wing angle of attack.

During the incidence transition following takeoff, the airplane is prevented from sinking by rotating the fuselage up to the wing rather than lowering the wing to the fuselage. This is accomplished in part by automatically repositioning the horizontal tail and in part by pilot effort.

A great many other things happen automatically and at the same time: the wing leading-edge droop retracts, the ailerons retract from a 20-degree droop position and no longer double as flaps, aileron stops are engaged to provide a stick force increase at the one-half aileron position, speedbrake control is returned to the pilot (the speedbrake is automatically closed with wing up to provide ground clearance), rudder throw is reduced by additional stops, and a stiffer rudder feel spring is engaged. It sounds like a pretty complicated process and it honestly is.

However, undergoing this rather drastic transition enables the airplane to be in its element at the low speeds required for landing aboard ship and at the fantastically high airspeeds and mach

Continued next page

flying the **crusader**

Continued

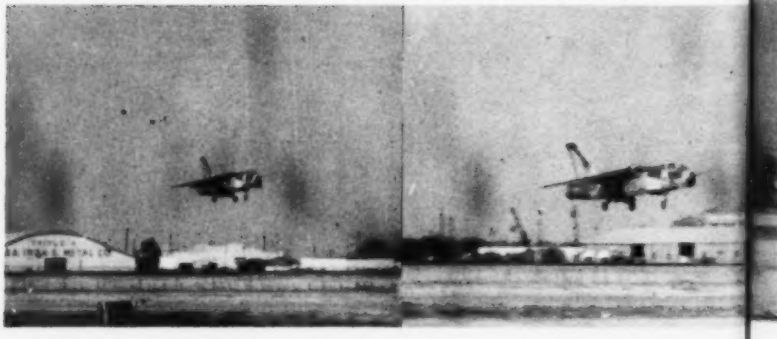
numbers required of modern fighters.

Typical takeoff procedure runs about as follows (assuming the airplane is lined-up, checked and ready). Run the power up to "skid tires" (low gross weights, military) while holding brakes, check engine and electrical instruments for proper values, release brakes and let her roll. Nose gear steering may be used if desired but is usually not necessary since the rudder becomes effective near 50 knots. Acceleration is quite rapid. At about 130 knots rotate the airplane so the nosewheel comes just clear and the airplane will fly at about 140 knots.

When well clear of the runway and accelerating nicely, raise the gear and stand by for incidence change. As the airspeed reaches 170 to 180 knots at 200 feet or above, place the incidence handle down and pull back slightly on the stick—just enough to help the automatically reset tail to rotate the fuselage up to the wing. The transition requires about 4 seconds from start to finish. Engage the wing lock and allow the airplane to flatten out gradually as it accelerates to climb speed.

Sounds simple? It is. About the only thing to watch out for is trying to lower the wing before sufficient airspeed and altitude have been attained. Everything else is standard and easy.

Jack Walton's advice to Crusader pilots is tempered with personal experience as a naval aviator, beginning in 1946 and including a big package of missions with VMF-312 "Checkerboards" in Korea. When he joined Chance Vought as a test pilot in 1952 he brought with him sheepskins from TPT at Patuxent and as an aeronautical engineer from Kansas University.



Though the wing mechanism is complicated, the operation as far as the pilot is concerned is simple. About the only thing to watch out for on takeoff is trying to lower the wing before sufficient airspeed and altitude have been attained. In addition, on afterburner takeoffs care should be taken not to exceed the airspeed restrictions with the wing UP.

Combat takeoffs (using afterburner, that is) differ very little from military takeoffs except that everything happens a great deal faster. First of all, the brakes won't hold the airplane with afterburner thrust (actually the airplane just skips off down the runway with wheels locked) so you must start the burner after brake release.

The airplane receives a startling boot in the tail from the burner and literally springs down the runway and into the air. The same caution concerning lowering the wing applies here just as much as following a military takeoff, but the conditions for the transition come much more quickly after breaking ground. In fact, most pilots complain that on their first few combat takeoffs they have their hands full getting the gear up and the wing down before exceeding airspeed restrictions. This is the kind of complaint that contractors don't mind hearing.

Crusader landing techniques, like takeoff techniques, do not differ greatly from those of other airplanes, past and present. There are certain unique features which do influence this airplane's landing characteristics to a marked degree, however; the variable incidence wing, narrow landing tread, large freeboard area, and flat fuselage angle at low speed all contribute to the general picture.

For instance, natural damping in roll is decreased when the wing is raised since the fuselage axis no longer lies so close to the roll axis—this makes the fuselage act a little like a pendulum when the airplane rolls in gusty air or from other causes. Fortunately, damping improves as airspeed decreases since the fuselage angle gradually increases and approaches the roll axis more closely.

From this, it is readily apparent that it is to your advantage to fly a slow landing pattern if roll stabilization is off. The same roll damping characteristic accounts for the airspeed limitation of 220 knots with the wing raised—at this speed roll damping becomes weak even with stabilization engaged.

The combination of large freeboard and narrow landing gear tread causes the airplane to tend to lean or heel downwind when exposed to a crosswind during takeoff or rollout. There is no danger of dragging a wingtip due to leaning, but the sensation is somewhat disconcerting when first encountered. Aileron into the wind is effective in reducing the lean angle, which incidentally reaches a magnitude of

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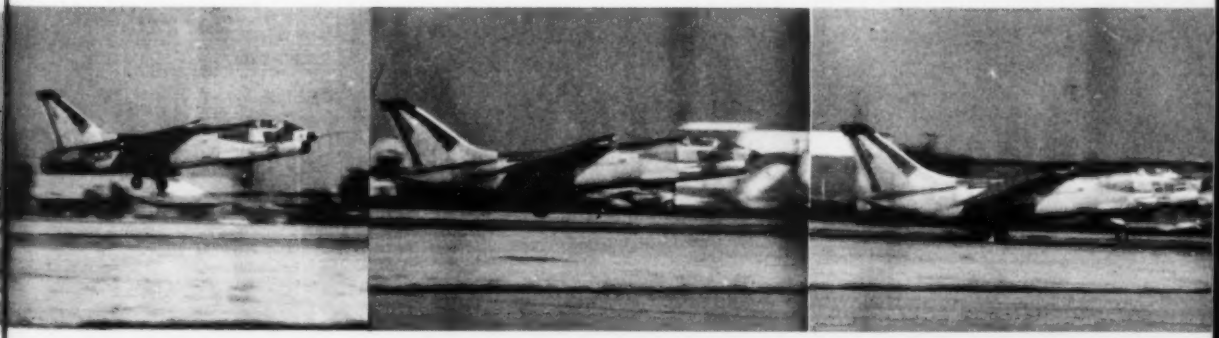


Plan your turn to provide a short, fairly flat final . . . don't overrotate or hold off too long . . . and after touchdown let the nose gear drop at about 100 knots . . .

The two-position, variable incidence wing enables the *Crusader* to be in its element both at low speeds required for landing aboard ship and at today's high mach numbers.

only about 4 degrees at most, ailerons neutral. If the crosswind component at 90 degrees exceeds 20 knots, it is generally better to seek a runway more nearly into the wind even at some sacrifice in runway length. This is particularly true for pilots new to this airplane.

The design geometry of the F8U-1 plays an important part with regard to touchdown and rollout attitudes. Since the fuselage angle remains relatively flat even at low airspeeds, the airplane cannot be touched down at excessive speed without contacting the runway nosewheel first.

Conversely, the powerful elevator, short main landing gear, and long, slim fuselage make it possible to bump or drag the tail. Between the two extremes there is plenty of leeway for normal operations. Tail bumping, the more likely occurrence, can and should be avoided by avoiding over-rotation during landing.

Rotating to very high angles of attack in an attempt to arrest a high sink rate or to stretch the approach is futile and will almost invariably result in a dinged-in tail. Stop the sink with power if possible but don't, please, over-rotate.

The *Crusader's* excellent brake installation is worthy of mention because of the great reduction in rollout distance possible through its proper use. The brakes, a boosted design like automobile power brakes, may be used at relatively high speed because of their excellent feel and precise control. Braking, begun at the proper speed for the fuel remaining (Example: 105 knots with 1000 pounds of fuel remaining), must be light initially but may be rapidly increased to heavy and maintained continuously to a full stop.

Brakes, wheels and tires get extremely hot under these conditions but they are designed to take it. This is not intended however, as an open invitation to all hands to start stomping indiscriminately on the brakes.

Stalling characteristics of the *Crusader* in the landing configuration are quite conventional. Stall warning in the form of buffet begins well in advance of the stall and increases in severity as airspeed decreases. At the stall the airplane yaws left or right and rolls off on the corresponding wing while buffeting heavily. The yaw break may be resisted by rudder but ailerons should be kept near neutral as an anti-spin measure. Recovery is easily made by relaxing back stick pressure and allowing the air-

Editor's Note:

Crusader *comment from a representative of NATC, Patuxent includes the additional information "that we have found that aerodynamic drag on landing, resulting from holding the nose gear off until it falls through at 60-80 knots, is more effective than in anything I*

plane to fly out of the stall.

With all the preceding factors in mind, then, let me describe a typical approach and landing. Initial approach and break should be accomplished with cruise droop extended to provide greater stall margin and smoother incidence transition. During the downwind, turn, reduce thrust and extend speedbrake as necessary to reduce airspeed. Extend landing gear when below 220 knots. Practically no trim change accompanies gear extension. Continue to slow to about 180 knots for the incidence transition. During the transition the automatic functions previously described occur in the reverse direction. A decrease in fuselage angle and increase in drag are quite noticeable. Plan the downwind to arrive at the 180 degree position with 150 knots and 1000 feet about 1¼ miles abeam of the runway—about 85% rpm is required for level flight. During the power-on, descending turn to final, gradually decrease airspeed to about 140 knots at the 90 degree position and to 135 knots on final (this assumes 1000 pounds of fuel remaining—add about 3 knots for each additional 1000 pounds to approach and touchdown speeds). Plan the turn to provide a short, fairly flat final approach. When sure of making the runway, ease power to start a small rate of sink. Use a gentle flare in conjunction with a partial or complete cut in order to touchdown at 125 to 130 knots. Don't over-rotate or try to hold off too long—just let the airplane ease on near cut attitude. Let the nose gear drop at about 100 knots and start braking, if desired. Maintain a straight track by brakes, rudder, or nose-gear steering.

That's all there is to it and it's just as simple as the description makes it sound. Observing about three basic practices in the *Crusader* will smooth out most difficulties during takeoff and landing: don't over-rotate, maintain a straight track in a crosswind, and allow plenty of airspeed and altitude for incidence transition. No other special precautions are necessary and standard practices apply. The airplane is a real pleasure to handle both clean and in the landing configuration and I'm sure you'll enjoy your experience with it. ●

Crusader brakes are designed to withstand the extreme heat built up during use, but—leave us not go ape.

have previously seen. Initially we were letting the nose gear down after touchdown and braking as necessary. The machine goes like a dart in the three-point attitude and tire and brake usage was excessive. (This was on Oceana's 8000' strips) The airplane is very "light on the gear" down to 100 knots at landing gross weights and the tires can be "skipped" easily. By holding the nose gear off, our tire and brake usage has been greatly reduced plus the fact that we were operating off 5500-6000' runways with no wind, and no strain. This, with more experience in the airplane however. There is the possibility of scraping the tailpipe but not anymore so than by over-rotating on landing.

"I also do not advocate use of nose gear steering on landing (because) if the nose gear steering is slightly out of adjustment and getting a stronger left or right signal it can swerve the airplane very rapidly and it will be impossible to stay on the runway.

"This happened to me twice so I always tell people to stay off nose gear steering on landing roll. (The nose gear being out of adjustment will not be noticeable on taxiing.)"

headmouse

Dear Headmouse:

In a discussion on ditching and other emergency policies, reference was made to a case history which quoted the pilot as saying, "I had only 150 to 200 pounds of fuel left, not enough to climb to a safe ejection altitude. I lined up on a destroyer and started a gentle landing approach . . . ."

Even with this low fuel state, couldn't the pilot have zoomed and gotten sufficient altitude to eject and thus have avoided the risks of jet ditching?

ANYMOUSE

Absolutely! Burn that last pound of fuel going up. Furthermore, even a power-off zoom may give you enough altitude to eject safely. See chart page 33, and article "When You Gotta Go," Jan. Approach *for details.*

Very resp'y
Headmouse

Dear Headmouse:

Attached is a copy of an ad in "Aviation Week" concerning oxygen mask connections.

In a local discussion, we were wondering if the Navy has, or is evaluating this or a similar connection?—The idea certainly sounds good—passed to you for info.

ANYMOUSE

The Navy has evaluated the MC-3 mask hose connector and believes it entirely satisfactory. A total of 43,000 units are under contract and delivery should start soon. They should be available in quantity soon.

However, do not be lulled into the feeling that this is the panacea for which we have been searching. A number of near-misses, and some fatalities, have resulted from separation of the oxygen hose but far more accidents have resulted from poor maintenance and improper care and testing of oxygen masks and regulators. A good check of the system in accordance with AC-SEB 7-54 prior to each flight will save a lot of pilots and planes.

Very resp'y,
Headmouse

Dear Headmouse:

Re "Test Flights: Suggestions for S.O.P." September 1956 *Approach.*

. . . I gather from the suggestions that something less than full power takeoffs are recommended during the 10 hours of slow time on a new or overhauled engine, since the writer's suggestion "E" states, "Upon completion of 10 hours slow time a full power takeoff be made." Suggestion "D" of the letter makes reference to T.O. 8-47 saying, in part, ". . . that Minimum Power Settings consistent with Maximum Safety be used . . ." also concerned with the 10 hours of slow time.

I have two thoughts on this subject . . . First, that anything less than full power on any takeoff is *not* consistent with maximum safety and second, that a reduced power takeoff can be more harmful to an engine than a full power takeoff.

In regard to using reduced power for takeoff, it's like using only part of the runway when all of it is available. Grampa Pettibone has made some interesting comments about pilots who got into trouble trying to get off from the intersection just to save a little extra taxiing.

Concerning my second thought, I contend that the only way using reduced power on takeoff would be easier on an engine,

(*continued on page 13*)

OVERHAUL ONE

"It was one of those hops where nothing went right for me. As I sat unhooded in the rear seat of the T-28B, I contemplated first, my chances of getting an 'up' on the hop and, second, how dark it was.

"My instrument instructor (front seat) had control and was beating a fast path for home at 1500 feet. Since we were late and far away, he 'full bored' the moaning plane. Then I noticed the exact power setting—36 inches and 1900 rpm. Such procedure I had been warned against in the training command.

"The question which came to mind was, 'Shall I push the prop up, advise the instructor, or sit and pray?' The first two choices I assured myself would result in a 'down' on the instructional hop from a 'pride-injured' senior. So I sat silent.

"After about 10 minutes of BMEP-exceeding flight, I noticed smoke in the cockpit and flames from the engine. The instructor called to ask me if I thought the engine was running rough. He was oblivious to the smoke, fire and impending disaster. Still praying for an 'up,' instead of a more desired safe sitdown, I didn't advise what I was thinking.

"The field loomed after 15 minutes at 270 knots (cruise 170 knots). One pass and the tower cleared us; but the old 'happy-go-lucky instructor' volunteered to take our aircraft around and give way to a second plane in the pattern.

"Panic! Both me and the tower. We both advised the instructor of the engine fire and trailing smoke. Cooly—possibly he was still disbelieving—he plunked the plane down and immediately shut down the engine, as ordered by the tower.

"Unstrapped, scared and ready to run, I couldn't get out because the instructor held the canopy closed. Fortunately, the fire died out as the engine was shut down.

"I got my 'up,' but more from a lesson on BMEP than instruments. To exceed BMEP is a costly gamble. Either way you lose. If not in 'necks,' in airplanes. Our T-28 needed a complete overhaul from 15 minutes of misuse."

#!†#/—For more engine operation please see "Easy Does It," page 14.—Headmouse.*

OVERHEARD IN AN OPS OFFICE

"The only pilots who check 'the' NOTAMs are 'them' officers from the Safety Center."

HEADS UP

"There has been a great deal of well-deserved comment of late on the need for maintaining a constant visual lookout regardless of the type of clearance the flight is proceeding under.

"An experience I had recently may be of interest. I was a passenger aboard an R4Y on a scheduled airlift and as a sweptwing jet jockey I spent most of the trip in the flight engineer's seat observing the silex pilots at work.

"It was disconcerting, to say the least, to discover that neither the plane commander or his copilot seemed the least bit interested in what was going on outside the cockpit (weather was CAVU and we were on an IFR clearance at 8000 feet).

"This was not an isolated instance as on the return trip with a different crew one week later (weather, type clearance and altitude similar), one pilot spent half the trip catching up on Saturday's football scores in the Sunday paper while the other concentrated on weight and balance forms and navigation.

"Granted, visibility from transport cockpits is severely limited, but it seems to me that this increases rather than decreases the need for maintaining a constant lookout. There are at least four pilots, evidently, who don't agree."

CHOCK SHOCK

"Taking off in an F4D-1, I engaged the afterburner and climbed out to 25,000 feet. I continued to climb using military power to 38,000 feet and flew at that altitude for about one hour.

"I then descended to the field and shot four simulated flameout approaches. After my last one, I became concerned as to my fuel state when I noticed the indicator had been reading 3500 pounds for sometime. I used the press to test circuit and discovered the indicator was stuck at 3500 pounds.

"I landed in the most expeditious way possible, and on touchdown the fuel indicator dropped to 2000 pounds, stopped, then dropped on down to a bare 200 pounds!

"In the chocks I had 22 gallons (143 pounds) remaining. I had made one near-fatal assumption that my rate of transfer from my droptanks was equaling my rate of consumption; hence, the stability of the fuel indicator at 3500 pounds. I should have, of course, kept a more accurate mental check on my fuel."

Anymouse continued next page

anymouse

and his hairy tales

Continued

THANKS BUDDY

Anymouse took off on a scheduled ACRO form hop. At 14,000 feet, while engaged in some routine formation, the instructor told the flight to shift blowers. Anymouse reduced throttle to 20"; glancing at the tachometer he saw a 6 where the needle lay. He promptly jammed the blower to high. This action was immediately followed by a loud grinding and a very hard jerk on the shaft. To his horror Anymouse discovered that he was not at 1600 turns but at 2600 turns. The moral of this story could be: shift more carefully. However, the best is yet to come.

The mill continued to grind the rest of the hop and the more he thought the more Anymouse was sure he was the stupidest, most bone-headed pilot in the Navy.

What would the rest of his fellow pilots say when they heard of this most horrible boner? But no one knew about it, so he was out of reach of their ridicules. After all, he had heard how to make a blower shift many times, but who can be perfect all the time. All these thoughts went through his mind during the rest of the hop and also while walking back to dispatch. Then he began to think of the AAR he read last week. Engine failure on takeoff. Probable cause: incorrect blower shift or too sudden an application of power causing the tail shaft to shear.

So with a red face Anymouse wrote on the yellow sheet: "Shifted blowers at 2600 turns. A/C down!!" and signed his name. Upon checking later, Anymouse found that he personally had twisted the tail shaft 6 degrees and 23 minutes, necessitating an engine change. He also found that he personally had saved a pilot's life by throwing away his pride, admitting his boner and downing the aircraft, saving some poor unfortunate pilot a forced landing or serious crash.

P.S. As it turned out nobody laughed. The only remark was "we are glad you *reported* it."

Please see "Easy Does It," page 14.—Headmouse.

CHANGE SIGNALS

"As leader of a section takeoff in F9F-8s, I raised my wheels, then unlocked my shoulder harness and rocked forward to check the harness—as I turned to prebriefed heading for an instrument climbout.

"I had briefed for an instrument climbout but by takeoff time the weather had cleared enough for VFR. I had also briefed for a preparatory hand flaps signal with a rock forward for execution. My wingman mistook the rock forward as a flaps signal and raised his flaps at a critical airspeed-bank combination. He didn't crash however; so we both learned something."

LONESOME GEORGE

"Here's one for the record—after 16 years and 5500 hours a night landing was made without incident—and without flaps in an SNB on a 3000-foot runway. Too late did I realize that "Lonesome George" had neglected to complete the last of the '3-to-go' rhyme. If it happened to me it can happen to you."

TAIL TALE

During a recent helicopter night flight, all was fine—until engaging the rotors and checking for navigation lights, it was discovered that there was no taillight.

Feeling that every good night pilot needs a taillight, the pilot shut down the rotors, leaving the engine idling. Enter an electrician with stepladder . . . Electrician climbs ladder to fix taillight . . . Fixes taillight. Crew chief, noting taillight burning, gives pilot "thumbs-up" to indicate that taillight was now operating in the prescribed manner.

Pilot, thinking "thumbs-up" means engage, cranks up to 1800 rpm. This is not unusual. Now lady luck enters the picture. Pilot, just out of curiosity, looks back at tail cone. Notes small electrician, large ladder, both in position to be subdivided by whirling tail rotor!

Anymouse's comment: "Pilots note that signal for engaging rotors is not a 'thumbs-up,' but a whirling motion with the hands. Likewise, crew chiefs might remember that when giving a "thumbs-up," make sure it canot be misinterpreted."

Look for NASC Helicopter Operating Signals poster scheduled for publication soon.—Headmouse.

headmouse

CONTINUED FROM PAGE 10

would be if reduced RPM as well as manifold pressure were used. A takeoff with reduced manifold pressure but full takeoff RPM does only one thing: it increases the length of the takeoff run. Therefore, the length of time the engine is required to operate at full RPM is increased along with the possibility of higher temperatures, higher rate of wear on new parts . . .

Since the procedure of making a takeoff with both reduced power and RPM is neither consistent with maximum safety nor particularly practicable, I maintain that a full power takeoff on a new or overhauled engine with the consequent earlier initial power and RPM reduction actually is easier on the engine and comes more within the original intent of T.O. 8-47 and certainly is much, much safer.

What say you, Headmouse?

LT M. R. BOYACK
NAS Hutchinson, Kansas

Concur. "GP" has at times expressed these general conclusions. Please see "Easy Does It" by Curtiss-Wright's senior field engineer, on the next page—Headmouse.

Dear Headmouse:

. . . During the summer at Jacksonville, cockpit temperatures of A3Ds parked in the sun exceed 120° F. With about a half hour spent within the aircraft getting strapped in, completing checklists, running up engines . . . crewmembers suffer undue fatigue from high temperature exposure. . . During carrier operations, downwind steaming and hot jet exhausts of parked aircraft in the stack will aggravate a like situation. .

The following solutions might be considered for relief of this problem:

a. A ventilated suit with cool air pumped in and distributed over the body through a connection similar to the G-suit hose;

b. A modification of the aircraft's refrigeration system to partially refrigerate the cockpit while the aircraft is parked or taxiing;

c. Use of a small portable refrigerating unit devised to pipe in cooled air while the aircraft is parked.

. . . Concerning the new colored summer flying gloves (dyed dark brown): . . . These impart an objectional blue stain to pilot's hands. This discoloration aggravated by perspiration is hard to remove . . . Because of this, pilots either refuse to wear them or hold on to the old fawn-colored ones and usually these are so full of holes that they provide little or no protection. . . Recommend corrective action to be taken to prevent disuse or misuse of an important protective item. . .

CDR. R. J. MARTIN,
MC, USN

High cockpit temperatures are recognized as contributing importantly to pilot fatigue. Further, in unventilated aircraft parked in the sun, electronic equipment may reach the temperature at which the equipment begins to deteriorate. This temperature may be exceeded while completing preflight adjustments. In order to restore and maintain satisfactory temperatures in all compartments within aircraft awaiting takeoff, ground conditioning units have been developed. These units provide cooling both by forced ventilation of air at ambient temperature and by refrigerated air.

An additional unit for use on flight decks of aircraft carriers has been developed for cooling with forced draft of ventilating air at ambient temperatures. Tests of this unit have been completed with satisfactory results.

In addition to the units mentioned above, a small portable unit is under development for furnishing ventilating air only to pilots wearing the Navy full pressure suit. The contract covering this development is currently being amended to include means for cooling the delivered air by refrigeration to any desired temperature down to + 50° F. This development is scheduled for completion during the calendar year 1957. The unit should be capable of attaining tolerable temperature conditions in the cockpit of any single-place aircraft prior to flight. Establishment of standard allowances of mobile air conditioning equipment is planned in the near future.

Re gloves: BuAer states that light colored gloves are specified for future procurement. Various colored gloves are being evaluated for best signaling features.

Very resp'y,
Headmouse

Re: Anymouse Telephone

An innovation for all Anymouses in the Basic Training Command is currently in the mill. An Anymouse telephone, complete with tape recorder, will be installed. Safetymouse (Anymouse NABTraCom Cousin) will answer the phone and advise the hairy tale teller (Anymouse) that the conversation will be recorded. Anymouse may then make this report. Names are not necessary and telephone calls will be used only for the purpose of furthering the aviation safety program by making it more convenient in reporting hairy tales.

An interesting arrangement for getting quick local action or publication. However, Headmouse at NASC requests that all Safetymouse Cousins screen these telephoned reports and send a copy of the pertinent ones, with action taken, to NASC. That way everyone can get the word.

Very resp'y,
Headmouse

EASY DOES IT

BY GENE BABLE

Senior Field Engineer
Wright Aeronautical Division
Curtiss-Wright Corporation

Gene Bable became a Marine naval aviator after AvCad training in 1942. He flew Mitchells in WWII South Pacific combat. Later he flew R4Ds and R5Cs. He was released to inactive duty in China and there flew as airline captain with Civil Air Transport, 1946-1949; subsequently, he continued as captain for Ethiopian Air Lines, 1949-1951; Near East Air Transport (Israel), 1951-1952; Civil Air Transport (Formosa), 1952-1955. He joined Wright in 1955 and holds a BS degree from Pennsylvania State Teachers College.

YOUR RECIPROCATING engine is built to withstand extremely high pressures within the cylinder; it develops more than one horsepower for each pound of its own weight; but take it easy on the throttle—it has to be operated within its limitations and according to the instructions laid down for it.

Don't let "Walter Smitty" snow you with his inscrutable

The forced landing of this AD was caused by an engine failure which began with a slightly hydraulicked rod . . .

logic when he says that "any neophyte can plainly see that the engine, being an inanimate object, neither feels pain nor possesses the ability to show its dislike for persuasive explorations into the abnormal." Just like any solid citizen the engine will tolerate and forgive the occasional, unpremeditated (and sometimes *pre*meditated) excesses inflicted on it; but there comes a point when the engine unequivocably voices its displeasure at persistent imposition.

Let's look at a recent series of engine failures which when investigated definitely pointed to "hydraulicking" due to liquid locks.

The flight handbook spells out a desired number of blades to be turned through before starting the engine. When this procedure is not followed rods can be broken. Even more serious, they can be bent so that hours hence failures occur, most often to pilots who inherited the conditions from predecessors who had neglected to pull their props through with the starter.

Many other troubles can be traced to backfiring and afterfiring while starting the engines.

To really appreciate the seriousness of these "big blow" twin scourges, ask your maintenance chief to show you around the engine boneyard—you'll see cracked intake pipes, blown out intake pipe seals, damaged spinner discharge valves, broken carburetor diaphragms and automatic mixture control bellows, deformed air scoops, disfigured hot air doors, and torn exhaust stacks and flanges. The subsequent engine malfunctions can be engine roughness, loss of power due to intake leaks, improper fuel metering causing roughness or even detonation, high CHT, and fire hazards associated with exhaust leaks.

Your starting procedure was adopted to cut backfiring and afterfiring to a minimum. Using steady prime as the source of fuel you admit a fixed fuel flow into the induction system. The only variable then is the airflow which is readily controlled by

. . . Later, piston rings were driven below cylinder skirt during high power output causing complete power failure.

EASY DOES IT

Continued

A bit of aviation lore still finding its way into present day practice is that the pilot saves his engine by reducing takeoff power when at a low gross weight or on a long runway.

Not so, says the engine. Full power is recommended on all normal takeoffs for several reasons:

Broken accessory and starter drive shaft (left) of R3350 was attributed to improper shifting of blowers. Excessive BMEP caused cylinder at right to separate from crankcase.

the throttle; whereas the use of mixture control lever and throttle can introduce large variances in the quantity of fuel and air, thus inviting the backfiring and afterfiring.

The old salts will claim they have the "touch" and can pump mixture control and throttle with impunity. That big explosion you just heard on the ramp was a "salt" being peppered with induction system debris!

1, lower MAP means reduced cylinder pressure which increases the bearing loads at the high takeoff RPM;

2, aircraft is airborne sooner, necessitating less runway and improving safety margin;

3, higher airspeeds are attained sooner for better cooling;

4, high power is reduced sooner resulting in fewer piston ring miles.

Let's run through a few more items that could help keep that engine package "firm." When going into a dive de-exhilarate yourself just for a moment to give a thought to the very high inertia loads you place on the rods and bearings when you chop excessive MAP at high RPMs.

When possible, the engine would like, as a minimum, one inch of MAP for every 100 rpm; so if you have 2000 rpm, a safe MAP lower limit would be 20 inches.

Although blower shifting for the R3350 is clearly defined in the handbooks, there are still cases like the following: an eager wingman who was taught to shift blowers on command of the flight leader, did exactly that one sunny afternoon. Unfortunately, the RPM read 2400—a mere 800 rpm above the 1600 rpm and 20" MAP normally called for. The engine developed metal indigestion in the sump.

Regarding power settings the engine will take any combination of high RPM lower MAP, or low RPM and high MAP, providing the BMEP limits for the model are not exceeded. Remember, the fewer the RPM the fewer the piston and ring miles.

You might also keep in mind that if your carburetor metering becomes inoperative the steady use of prime provides about 200 pounds fuel flow and the constant head idle spring in the carburetor provides another 200 pounds for a total of 400 pounds.

Our point in going over these few facts of engine life is to reemphasize that the man in the cockpit has a good solid, substantial friend in the reciprocating engine (or engines) he has with him—a firm and fully packed power plant that can and frequently does answer calls "above and beyond"; but, take it easy on the throttle, treat it like the precision equippage it is.

Make it S.O.P.—smooth operating procedures. ●

TRUTH and CONSEQUENCES

TAKE HER DOWN!—Shortly afternoon a two-plane CAP was launched from a carrier. The weather: 2000 feet overcast and four miles visibility, with rain showers in all quadrants.

The ship was operating near a quasi-stationary front which covered an area 30 to 40 miles wide. It contained numerous squalls with rapid variations in the weather within those squalls.

After an hour and a half the flight returned for recovery and the approach to the ship was made under CIC control. The aircraft entered the tops of the overcast at 22,000 feet and broke out contact between 100 and 200 feet in heavy rain.

The landing pattern was made primarily on instruments with the 180-degree abeam position being determined by bearings on the ship's low frequency homer. By the time the last man was in the pattern visibility was down to between 350 and 900 feet in heavy rain with an indefinite ceiling of from 100 to 200 feet.

The aircraft was not sighted by the LSO until it was about 30 degrees from the final and the pilot did not see the LSO at any time. He made all corrections from instructions received by radio. Due to the driving rain the pilot's forward visibility was zero with very limited visibility out the side panels.

His second pass was "normal" and he received a cut. He started his cushion slightly early and was still airborne in a nose-high attitude when the hook engaged number 2 wire. Initial contact with the deck was on the nose gear—which sheared off. The F9F-5 came to rest on the centerline with no injury to the pilot.

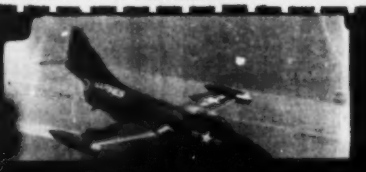
Primary cause of this accident was given as weather by the board. The recommendation was also made that during FCLP or CarQuals a flight period be devoted to approaches made with LSO instructions given by radio.

The squadron skipper said, "My own reaction after observing this landing was to congratulate both the pilot and LSO for an excellent job under very adverse weather conditions."

Continued next page

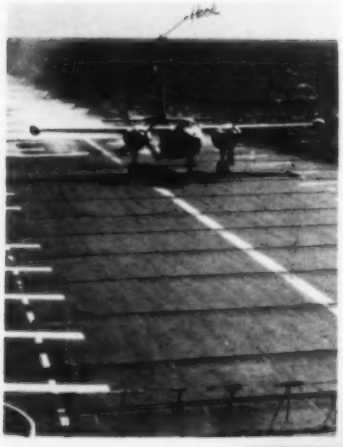
"The Wages of Sink"

With visibility critically limited due to driving rain, on receiving the cut the pilot started his cushion slightly early . . . engaged the arresting wire in a nose-high attitude . . . contacted the deck nosewheel first, sheared it off. . . .

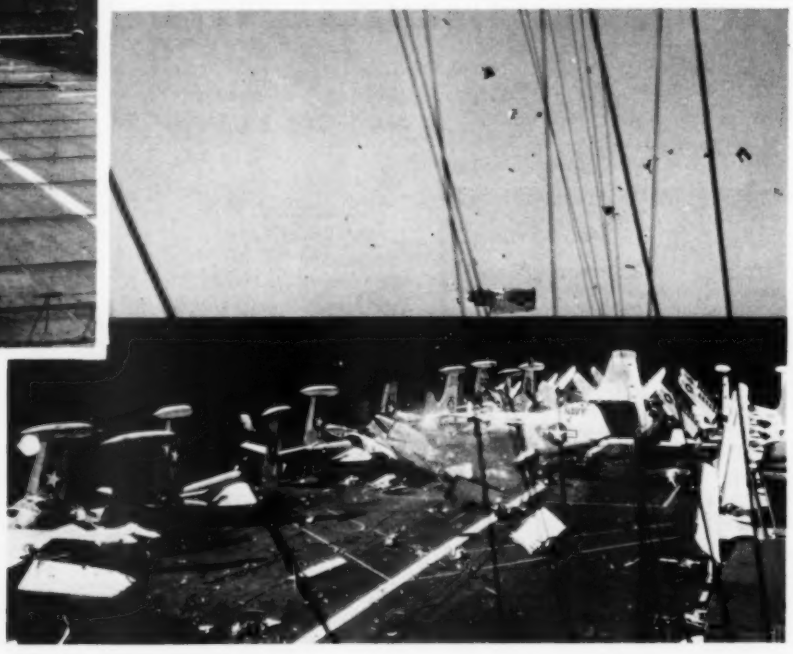


TRUTH and CONSEQUENCES

continued



Neither the pilot or LSO had worked a carrier no-flap landing with the AJ.



VAH

WHOA MULE—During a navigational training flight the pilot of an AJ-1 reported the loss of utility hydraulic system pressure. Lowering of flaps and gear would be by means of the emergency hydraulic system.

At recovery time the gear was lowered but the flaps failed to lower. The pilot then notified the carrier he would make a no-flap landing with an approach speed of 120 knots. It was noted by the accident board that in some types of carrier aircraft a no-flap approach in an emergency is considered a part of squadron doctrine and is accepted by the ship as standard operating procedure. Thus, when the pilot called Pri-Fly and stated he would make a no-flap approach his decision was not questioned.

However, squadron doctrine had not covered the no-flap carrier or field carrier approach situation and the pilot was given no training in this type of approach. The LSO had not previously waved an AJ on a no-flap carrier or field carrier approach.

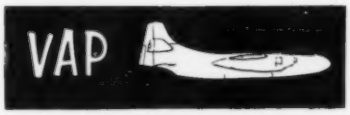
Three suitable diversionary fields ranging from 108 to 157 miles were available at the time of the accident as was adequate fuel to safely divert to the beach.

Two approaches were made while the ship increased speed to produce 41 knots of wind over the deck. On the third approach the ship was ready and as the plane entered the groove the pilot reported, "Airspeed 125 knots slowing to 120." Immediately after the cut signal the AJ lost

altitude and the hook struck the ramp, breaking off.

The AJ touched down and floated up the deck in a nose-high attitude, passing through the barriers without engagement. It continued into the pack and came to rest on the number one elevator. Fire broke out but was quickly extinguished by the ship's fire parties. There were no fatalities.

An AAR endorsement noted that a no-flap landing with proper wind and arresting gear conditions was feasible. Further, the recommendations of the board that squadron pilots be indoctrinated in the procedure for no-flap carrier landings are to be introduced as soon as practicable.



WESTWARD HO!—An hour out of a Pacific island base, the navigator of an AJ-2P prepared to shoot a series of sun lines and take a deviation check. It was at this time that he discovered that the sextant mount was not aligned properly.

The aircraft was headed west to a destination 1400 miles distant. Weather was expected to be VFR with the exception of occasional cumulus build-ups. The course of 272 degrees magnetic had been established from the radio range at the point of departure, and the radio compass gave a steady bearing on that station until about 100 miles out.

"I made note to the navigator," said the pilot, "that the magnetic compass and the G-2 repeater were lined up exactly the same, rather than at a few degrees variance, which is normally the case. It was also noted that only the two rear rubber mount fittings were holding the magnetic compass in its mount, the forward fittings not being attached."

The sun shots were taken and the deviation check revealed a true heading of about 210 to 230 degrees with computations on the sun lines showing large intercepts. The disagreement between these and subsequent sun lines and other factors of the navigation convinced the navigator that sun lines and deviation checks were unreliable. Consequently, no faith was placed in celestial navigation.

After droning along for four hours the occasional cumulus build-ups thickened into instrument weather, accompanied by high turbulence and rain. Three hours of instrument weather followed, with the pilot discovering the awful truth that ADF was inoperative; it would not receive any stations, emitting only a steady hum on all bands.

Though the estimated time of landfall was rapidly nearing, radar indicated no land targets. "Therefore," continued the pilot, "without primary or electronic navigational aids, our only means of navigating was to hold the compass heading which was determined prior to entry into the instrument weather.

Finally breaking into the clear, some 15 minutes after expected landfall, a group of small islands were spotted. The pilot and navigator, unable to determine their position, declared themselves lost. After orbiting the islands for about three hours, no fix or steer was obtained, although the crew had been in constant HF contact with several ground stations since breaking clear of the weather.

With the approach of sunset and a lowering fuel state, the decision was made to abandon the plane. Survival gear was dropped on a low pass across one island; then, after climbing to altitude, all crewmembers parachuted safely to land. On the following morning they were rescued. Position of the bailout was 700 miles south southeast of the intended destination, a point bearing 242 degrees from the point of departure.

In the subsequent investigation the accident board found the flight's (disregarded) celestial navigation more accurate than the navigator thought. From the sun lines and deviation checks, it was estimated the aircraft had been on a heading of 226 to 246.

It was apparent that the compasses were in error. Upon checking it was found they had not been swung in a year. How the G-2 compass and the standby magnetic compass agreed exactly and how each could have the same error is hard to explain. It is possible, reasoned the board, that the pilot set the G-2 compass with the magnetic compass which may have been grossly inaccurate. Then failure of the G-2 compass slaving device could have prevented its return to an accurate bearing.

The radar failed to pick up a large island about 120 miles to the northwest of the bailout point from an altitude of 10,000 feet as it was estimated to have had a useful range of only 50 miles.

Among the board's recommendations were:

(a) the practice of checking the G-2 and magnetic compass against runway headings become a standard check before takeoff;

(b) all pilots and navigators receive an intensive navigation review, particularly in celestial navigation and they be required to pass written tests on the subject being before allowed to participate in long overwater flights;

(c) when any maintenance had been done on the G-2 system such information should be passed on to the navigation officer for decision as to whether reswinging is necessary.

Please turn page

TRUTH and CONSEQUENCES

continued

SPIN-IN—A few minutes after takeoff for CV landing practice, and while at 500 feet, the oil pressure on the port engine of an S2F dropped to zero. This loss of oil pressure coupled with the pilot's inability to reduce the RPM below 2400 prompted a request for an immediate recovery.

The approach was intended to be made with both engines and was to be fast and wide. At the 90-degree position, at 300 feet and 115 knots, a severe vibration and complete loss of power from the port engine was experienced. The pilot jerked up the gear and turned to parallel the ship's heading while the copilot feathered the port engine.

This stopped the vibration, but in so doing, single-engine speed was lost. The aircraft stalled and started a spin to the left from 20 feet. The port wing struck first and the plane stopped 180 degrees from its original heading. Within 10 seconds the pilots were clear and 30 seconds later the plane sank.

From the position of the initial failure, 500 feet, in a clean condition and at 115 knots, a much more prudent decision, according to the board, would have been to feather the bad engine, continue the climbout and retrim the aircraft before attempting a landing.

The Light Approach

". . . and then Sir, right after the copilot remarked on the smooth touchdown, I heard a kinda grinding sound"!

GROUNDS FOR TROUBLE—When the pilot of an AD5N experienced a rough running engine, he turned toward land some 35 miles distant. Nearing the coastline the engine began smoking and the pilot of an escorting aircraft advised a water landing parallel to the beach. The sea state was calm. No answer was received to this suggestion though the AD pilot had acknowledged and followed other suggestions from the escort pilot.

Shortly thereafter, the AD was over and parallel to the beach at an altitude of 150 to 200 feet. A turn inland was made to avoid a stone building and fishing boats directly ahead on the beach, after which the AD pilot turned parallel to the beach, flying about 300 yards inland.

He held this heading and altitude about 30 seconds and then commenced an emergency landing approach, gear up, flaps down at about 95 knots. The terrain in this area was mostly flat and cultivated but the plowed furrows ran at right angles to the aircraft's heading. Shortly after touchdown, it struck a four-foot-high embankment of a drainage ditch and began breaking up. Following this the aircraft exploded in a huge ball of flame. The pilot and one crewman were killed and one crewman escaped with serious injuries.

The escort pilot stated he had made three or four passes over the "landing area" before he could see the embankment and drainage ditch. The accident board considered that the pilot erred in that he did not select either of three better landing areas: (a) calm, deep water, (b) wide, sandy, unobstructed beach, (c) parallel to the plowed rows of any of the fields.

It was recommended that unless the pilot can "drag the area" prior to landing, a water ditching be considered first when a choice exists.

FULL RICH—Returning from a night fam flight in an AD-5, the pilot orbited at 3800 feet to await entry into landing pattern. The engine began to run rough with a 200 rpm fluctuation and the pilot put mixture into full rich.

Immediately flames burst out from top of cowl. Before pilot could turn off fuel, fire had become so intense he elected to bail out. After opening the canopy and releasing his lap belt, he half stood in the cockpit. However, his left shoulder harness, to which his oxygen hose was still clipped, and the 150-knot airstream interfered with a normal bailout.

He returned to a seated position in the cockpit, rolled the plane about 110 degrees to the

left, pushed forward on the stick and left the plane with no further difficulty.

At this local hospital he was treated for minor burns on the back of the neck and hands as a result of passing through flames on a bailout. He cleared the tail by a wide margin and the chute opened with no noticeable jerk.

Available evidence from the crashed airplane pointed strongly toward a No. 2 cylinder failure, possibly from some previous hydraulic lock or a master rod failure [*See "Easy Does It" Page 14*]—but the subject cylinder disappeared from the scene of the crash before Navy officials could reach the site. A radio and newspaper appeal for the return of the cylinder brought no response and failed to yield the missing part.

The pilot was not wearing gloves at the time of the bailout —which probably accounted for the burns. His flight suit had recently been flame-proofed and thus prevented more serious burns.

The board recommended that at first indication of engine roughness pilots should not put mixture in rich, but retard throttle, if time permits, until determining the difficulty: if fire is going to ensue. Putting the mixture in rich and adding throttle will intensify the fire.

The board recommended that, at the first indications of AD engine fire, pilots be warned to throttle back, cut mixture and turn fuel selector OFF and to open cowl flaps if time and altitude permit.

The pilot of another orbiting plane, on observing the flaming aircraft, "flew a circuitous route to the crash to avoid any possible parachute, and continued to orbit until recalled for a landing".

Now there was a neat bit of headwork—how many pilots would have remembered to do that?—Ed. ●

wheels up SAVES

Cahn, B. (n), AC3, NAS Quonset Point, 8 November 1956

As his second save this year, Control Tower Operator Cahn visually checked an AD turning final approach after reporting "gear-down-and-locked." The dive brakes were extended but the gear was not down. By radio, Cahn advised the pilot that his gear was up and a successful waveoff was initiated.

Madden, T. E., AC1, and Hyder, D. R., AC3, NAS Chincoteague, 21 November 1956

The pilot of a TV-2 reported on base, "gear-down-and-locked." Observing through binoculars that the plane's wheels were not down, Madden informed Hyder who ordered a waveoff over the tower radio.

Gidden, E. W., AC2, and Schuck, G. S., AN, NAAS Cabaniss Field, 16 November 1956

The pilot of an AD-1 pulled up the landing gear instead of the dive brakes over the end of the runway after making a simulated emergency approach. Schuck on the end of the runway as wheel watch, immediately fired flares while Gidden in the tower broadcast "waveoff, no wheels." Previous saves credited to Gidden, 6; to Schuck, 1.

Dejarnett, J. C. AN and Lewis, N. L., AN, NAS, Whidbey Island, 29 November 1956

An F3D making touch-and-go landings commenced a wheels-up approach although reporting to the tower that the wheels were down. Dejarnett and Lewis gave the waveoff signal with paddles from their position on the end of the runway. The signal was not observed, so flares were fired and the waveoff was then initiated.

Breuer, H. L., AMAN and Mitchell, H. L., AN, NAS, North Island, 5 November 1956

Breuer and Mitchell, standing the night wheels down watch, successfully waved off an AD aircraft that was making an approach for landing with the landing gear retracted. Flares were used to signal the unsafe condition.

Lt J. E. Mulcahy and Picarello, D. D., AN, NAS, Cecil Field, 9 August 1956

The pilot of an F9F-5 reporting "wheels down" while they were actually up, was given waveoff by Lt. Mulcahy on the runway portable radio and Picarello utilizing paddles. An attempt to fire flares was unsuccessful due to over-aged Very pistol shells. The old shells were discarded and replaced with a new lot.

SSgt R. E. Robinson, NAAS, Edenton, 20 October 1956

An AD-4 was turning into final approach when Robinson, Control Tower Operator, observed no gear and ordered a waveoff by radio. Robinson is credited with several previous saves.

Perhaps the most important audience a pilot will ever play to would be the air and surface craft which are searching for him. To win recognition, the star of this search and rescue drama should be able to stage a one-man spectacular in the way of attracting attention. Properly rehearsed, even an amateur can become . . .

OUT OF THE ORDINARY

THE destroyer steamed a lonely course across a dark, moonless sea.

"Somebody out there," the telephone talker in No. 3 mount suddenly complained, "is shooting at me!"

The bridge talker listened to the message, and quite properly asked for a repeat.

"I said," came the aggrieved tones of No. 3 mount, "there's somebody out there shootin' at me!"

"You stupid or sumpin'?" inquired the bridge talker, foregoing proper procedure to get at the heart of the matter, "there ain't nothin' else out here in the ocean but us!"

This interesting conversation becomes a little more understandable, perhaps, with the knowledge that there was, indeed, someone else out there on the ocean with the "tincan."

The someone was a pilot, in a liferaft, and he *was* shooting at the destroyer, but for a purpose . . . Ever hear the story about the farmer and the mule?

Seems this farmer was standing beside his mule, fervently cussing the obstinate beast, which refused to move an inch. A mule skinner came up, saw the difficulty and offered a helping hand. "Yuh gotta use kindness and understanding with mules, neighbor," he said. "Now watch me get this mule moving!" Whereupon he picked up a fence post and flailed the beast right between the eyes. The farmer got all riled up.

"Neighbor," the mule skinner replied calmly, "fust you gotta get their attention!"

Back in the liferaft, the pilot was doing just that. He was getting the attention of the passing ship. His method was a bit out of the ordinary, but that's the whole point of this discussion.

Now neighbor, there ain't many fence posts in the ocean, and they don't come as liferaft equipment. But there's better ways than fence posts to get attention especially when you're 40 miles from a cup of coffee and not a phone booth in sight.

Attention—Getting, Two Ways

Split this attention-getting deal in two. Either it can be seen (visual, electronic), or it can be heard (audible, electronic, whistle, shouting). Finding waterborne pilots and lost plane crews by visual contact has kept the majority of survivors from getting waterlogged and homesick.

Whatever your particular situation, keep one important point in mind. Be sure that what you are doing or showing *is* out of the ordinary to anyone in the area, and, that it has a reasonable chance to be noticed under the existing conditions.

Tooling along at high noon in a *Beech* you see the smoke a long time before you see the smoke stack. At midnight you can't see the smoke or smokestack from anywhere,

but you see the head clearance light from afar.

Out of the ordinary—reasonable chance to be noticed.

To make visual contact a paying proposition, you as a survivor have got to be seen. One sea-soaked lad tried to get attention by standing up in his raft and waving his arms. The search plane didn't see him wave his arms, but spotted the splash he made as he fell overboard. Not recommended as SOP, but he got their attention!

Out of the ordinary—reasonable chance to be noticed.

Attention is something that is obtained by being out of the ordinary. An Arctic jackrabbit is white in the winter. He isn't often visible. Paint that white rabbit with fluorescent red paint—he's out of the ordinary.

Out of the ordinary—reasonable chance to be noticed.

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OUT OF THE ORDINARY

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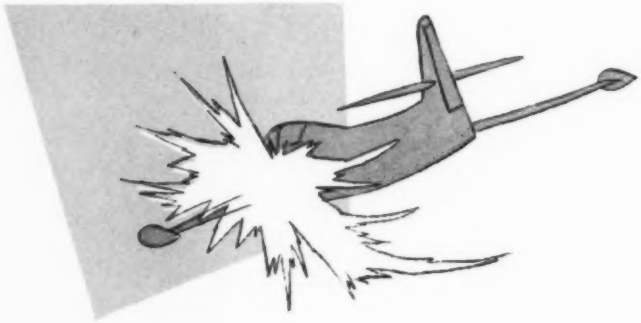
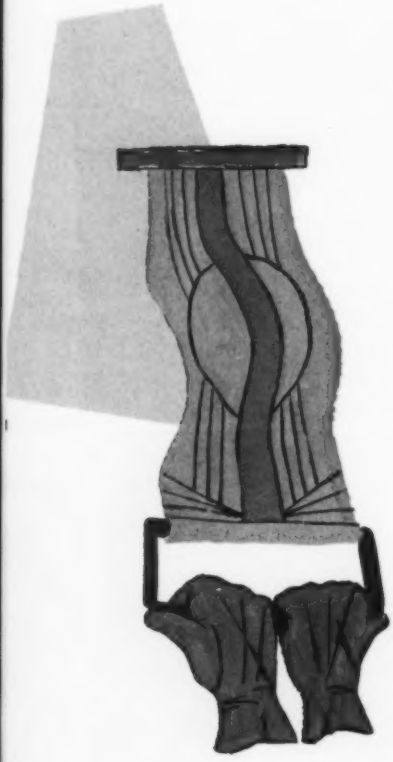




A bright green splotch in a big, blue ocean is also out of the ordinary. In one statistical survey, almost two out of three who used dye marker during daylight were sighted by that means alone.

An excellent account came in recently of how one survivor at night applied this rule of "out of the ordinary."

'Steady Eddie'

Because of the completeness of the pilot's account, we've included the entire sequence of actions leading up to his efforts to attract attention.

Less than 10 minutes after being launched from a carrier on a night GCI flight, the port engine of an F2H-3 exploded, and shortly afterward fire and vibration compelled the pilot, Lt. (jg.) E. L. Jenkins, to eject at 15,000 feet some 43 miles from the ship. The pilot had been able to transmit "Maydays" and GCI had been tracking the airplane to provide an accurate location on his ejection. The sensations experienced by the pilot and his ejection-survival procedures used are recorded in an excellent manner in his statement, portions of which are presented here.

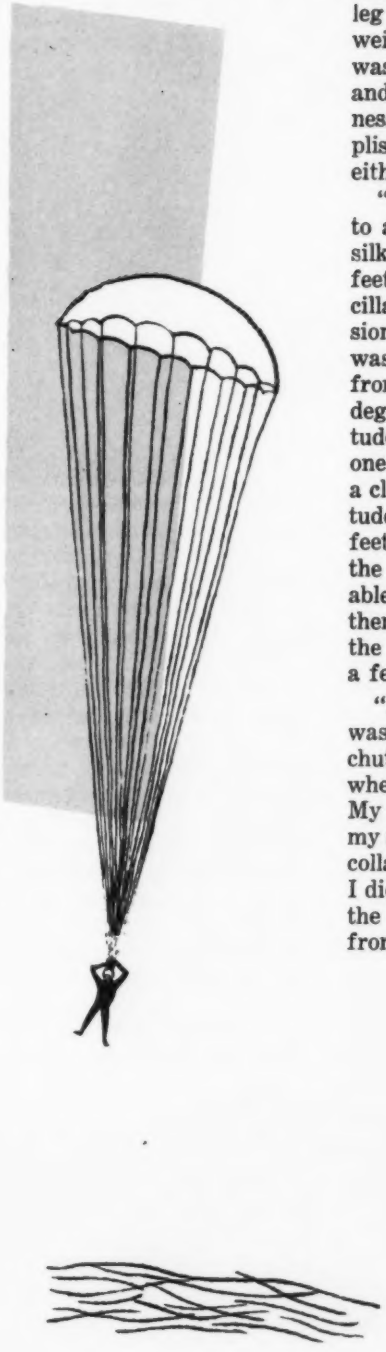
"When I executed the decision to eject, all survival equipment was in its proper order. I positioned my feet in the stirrups and pulled the leg braces. The canopy fired properly and blew clear of the cockpit area. I then sat upright and peering over my right shoulder saw and grasped the face curtain handle with both hands. At this time I thought about disconnecting the oxygen hose clip from my shoulder strap and pulling the bailout bottle. However, I decided against this and pulled the face curtain.

"I was ejcted clear of the plane and almost immediately began to rotate or tumble at a fairly fast rate. I believe I held onto the face curtain for approximately one rotation or tumble. At this particular time I began to feel for my D-ring and could not find it. I began

to panic slightly and started clawing my left side in search for the D-ring. I began talking to myself and reassuring myself step by step what I should be doing.

"Regaining the composure I had previous to the ejection I momentarily relaxed and then releasing my safety belt kicked free of the seat. Starting at the bottom of the left parachute shoulder harness I began walking my hands upward and found the D-ring dangling out of its position by the attached cable. I grasped the D-ring with my right hand and drew it upward and to the right to my full arm length. It pulled so easy that I believed I had broken it from the cable and began to reach around for the seat pack to open it manually. It was a very dark night and I do not know what attitude my body was in, but this action was stopped short by the sudden and terrific jolt of the parachute opening.

"The resulting force of the parachute opening caused severe pain in the area of the crotch and armpits. The pain in the crotch was caused by the leg straps holding my body weight and I was not bruised. I was not able to raise my body and sit in the seat of the harness (I was not able to accomplish this feat at survival school either).



"The parachute did oscillate to a noticeable degree and the silk began to fold inward 5 or 6 feet on the high side of the oscillation on 2 different occasions. I worked the risers and was able to keep the parachute from oscillating to a dangerous degree. I had no sense of altitude above the water except at one time when I passed through a cloud with a known base altitude of approximately 2000 feet. A short time later I heard the waves breaking and was able to see a few white caps. I then saw starlight reflection on the water and struck it within a few seconds.

"I was facing the wind and was on the side of the parachute oscillation into the wind when I contacted the water. My feet hit first, followed by my seat and back with the chute collapsing downwind from me. I did not go under the water on the initial contact (at least from the waist up). I had un-

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OUT OF THE ORDINARY

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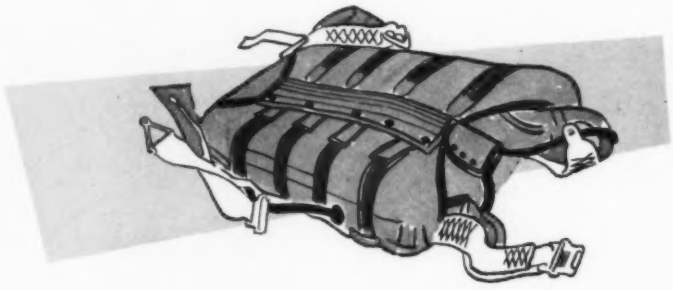


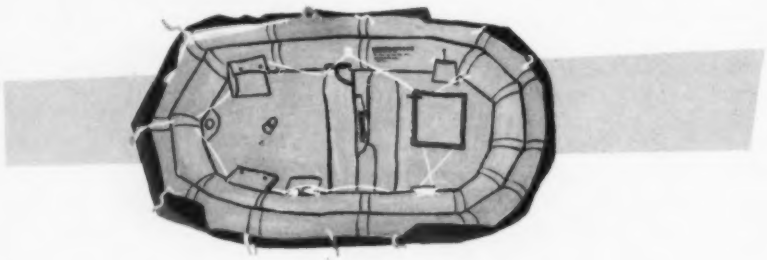
fastened my parachute chest buckle on the way down and immediately slid out of the left parachute harness holding the right harness in my right hand. I pulled both CO_2 bottles and inflated my Mae West. I then proceeded to unfasten the leg straps and completely clear myself of the harness with the exception of holding onto the right shoulder harness.

"The Mae West was not keeping my head sufficiently above the water so I inflated my G-suit which in turn brought my legs to the surface. I manually inflated the third compartment to the Mae West and floated nicely on the surface of the water. I then grasped the PK2 kit lanyard attached to the Mae West and worked my hands along the line towards the kit. *I experienced some difficulty in grasping the quick release on the PK2 kit which necessitated the removal of my gloves.*

"Following the same procedure, after throwing the gloves away, I again experienced difficulty in releasing the quick release, but after several attempts I was able to remove the PK2 kit from the harness. I experienced no difficulty in opening the PK2 kit, inflating the raft, and climbing in. Once in the pararaft, I checked the security of the lanyard from the Mae West to the pararaft, the security of the sea anchor, and pulled in the PK2 kit securing it between my knees. In the difficulty experienced releasing the PK2 kit from the parachute seat I let loose of the harness. The parachute remained within a few feet of me during this time. Although I thought of fastening it to the pararaft I made no attempt to do so.

"About this time I heard the drone of the first airplanes and prepared my revolver and flares for release at the proper time. When the first aircraft was within what appeared to be a good visual range I set off one night flare.

"A few minutes later I fired 2 or 3 tracers across the aircraft's visual path. The first aircraft overhead set up a circular pattern which was followed by another aircraft dropping a smoke flare. This smoke flare landed approximately a



half mile away.

"As more aircraft joined in the search I continued to set off flares and fire tracers. Out of a total of 4 MK 13 Mod O flares, only 2 of the night ends were successfully lit off. I did successfully light off the day ends of those 2 flares which the searching pilots later reported were of good visual recognition. Other survival equipment used was the 1-cell flashlight attached to the Mae West and day signal mirror.

"By holding the flashlight in front of the mirror, it was reported by the executive officer of the DD to appear with approximately the same intensity as a running light on a fishing boat. I had removed the flashlight from my Mae West and secured it to the right trouser leg of my summer flying suit. This light was turned on whenever an aircraft appeared to be within good visual range.

"All flares were lit off, all tracers were fired, and all combinations of the flashlight and mirror were used only when the searching aircraft appeared to have my position between their visual 10:30 and 1:30 o'clock positions. In this manner I was able to conserve equipment, use it to the most effective means, and allow a continuous fix to be kept on my position. As for the 38 cal. tracers, I carried 29 rounds, 6 rounds of which, the tracer did not ignite. My first visual contact with the searching ships was the sight of several truck lights followed by a faint glow in the horizon. I continued to fire tracers for a continuous position fix.

"I saved 8 tracers to fire at intervals when the first ship was within a good visual sighting distance which I calculated to be that position in which I could remain in visual contact with the bridge level of the ship. At that particular time, I fired 2 tracers toward the first ship which was a destroyer. The DD immediately trained 3 searchlights in my direction followed by 2 searchlights from another destroyer and 1 from the carrier. I continued to use my flashlight and signal mir-

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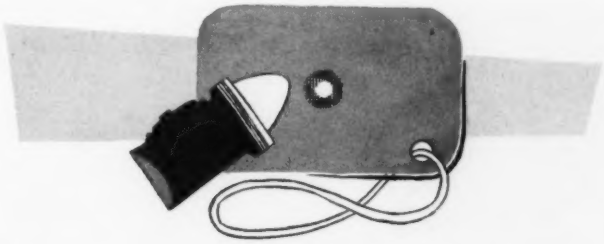

OUT OF THE ORDINARY

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ror which enabled the DD to keep a continuous searchlight on my position."

And, he was quickly rescued.

Out of the ordinary—reasonable chance to be noticed.

Tracers, flares, flashlight backed up by a mirror. Out of the ordinary on a dark ocean. Used only at the 10:30 and 1:30 o'clock position—more than a reasonable chance of being noticed.

The skipper's endorsement said in part: "It is and has been squadron doctrine within this command to carry the 38 caliber pistol with tracer ammunition on all night flights.

An additional comment: "Lt. (jg.) Jenkins used to be the object of some good-natured joshing from his fellow pilots due to the large number of extra bullets he carried on his bandolier. Since the accident, however, all the squadron pilots look like Mexican bandits when they are in their gear."

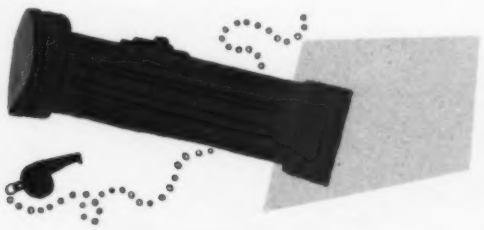
While we're on the general subject of signaling, the aeromed people have some other incidents and tips for you. Here they are:—

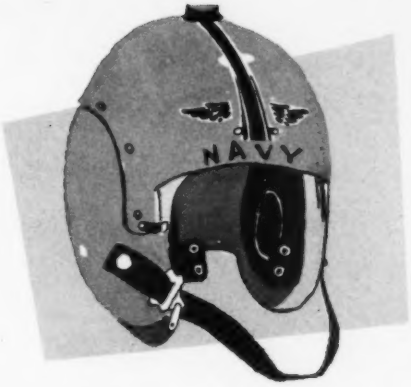
'Ready Freddies'

The night flight of the "Three Ready Freddies" is another to remember. They flew this crate onto, along, and finally into the water, 2 miles from the carrier. They got into the raft, with a total among them of 15 day-night signals. Seven day smoke signals were used before one of them figured there *must* be something else to signal with. As the smoke ends were thrown overboard (with the night flare still unused) and the trio was getting frantic antics at not being noticed, one did a most unusual thing. He started thinking. He pulled the other end. It was seen. They were retrieved. They were sent to MK-13-Mod-O school. They know now that "night flying is rough" and that the night, flare-end of the day-night distress signal is "rough" too.

The orange smoke on a pitch black ocean was out of the ordinary—but there wasn't a reasonable chance of *seeing* it—the night flare fulfilled both requirements.

To accomplish this out-of-the-ordinary technique, the downed aviator is equipped with red flares—orange smoke—dye markers, whistle, flashlight, bright red paulins and poncho, orange-colored raft,





gold-colored helmet, yellow lifevest, and emergency frequency radio transmitter, to name the common ones.

It's Up To You

These are all "out-of-the-ordinary" items. The "reasonable chance to be noticed" part is up to you.

The raft, paulin, vest, and helmet are "passive." They work by themselves at being out of the ordinary, and, in the middle of the ocean during daylight, have a reasonable chance of being seen.

The active items are for use at your discretion. Day and night flares, dye markers, whistle, flashlight, mirror, and radio are dependent on you to make them perform.

With the gibson girl radio, any transmission on it is out of the ordinary and it has more than a reasonable chance of being noticed. (See "Crank It Right", p. 10, April 56 *Approach*)

"Blasting in the blind" on the PRC-17 transceiver has a fair chance of being noticed, if—other aircraft are in the area.

One group of aviators in a jungle with a 60-foot vine and tree canopy overhead, used a similar walkie-talkie to home the 'copter to them by giving steers on the sound of the chopper's engine. A flare lit by the survivors after the chopper was directly overhead was dimly seen.

Out of the ordinary—reasonable chance of being noticed.

And don't forget the international distress signal of three fires in a triangular pattern. If it's dark make your fires big and bright. If during the day pile on lots of green leaves or wet grass and make it smokey. Place your fires about 200 yards apart and they can be seen for many miles.

When you know search activity is in the vicinity, scanning the horizon with the signal mirror, streaming your dye marker from your raft or vest, making furrows in snow and spelling out messages, burning oil-soaked rags and rubber in the middle of the desert, spreading your parachute out and standing in the middle, all these and many more are classified as—

Out of the ordinary—with a reasonable chance of being noticed.

Without benefit of using a fence post—

You'll *get their attention*—●

NOTES FROM YOUR FLIGHT SURGEON

SNAP TO IT

The snap in question is the one with which you attach your bailout oxygen equipment.

One pilot attached the gear to his shoulder harness . . . came an emergency . . . pilot ejected and left his shoulder harness behind. What do you think happened to the oxygen equipment? Right. It pulled apart—at the connection just below the facial part of the mask.

The pilot was lucky because no flailing broken ends injured him, and he was low enough not to need the oxygen.

But the right way, the safe way, is to attach the cloth strap to your chute harness—wrap it around twice and snap.

TIME BOMB

A recommendation of an AAR Board, which investigated a recent crash of an FJ-3, offers the following:

"On salvaging the wreckage it was noted that the center wing cell was still full in spite of fire having been present all around this area and molten metal being under the cell. For this reason it is highly recommended that all persons concerned with the wreckage stay as clear as their duties permit when the least evidence of fire or smouldering magnesium is present."

END OF MAN

"Do you ever fly by the seat of your pants, as the old saying goes?

"If you're inclined to discount the pilotability of your posterior, harken to an experiment undertaken by Dr. H. Strughold, a former Luftwaffe specialist in aeromedicine. He decided to find out if a pilot really does receive aid in the form of 'gravity reports' from nerve impulses transmitted through his seat. Dr. Strughold injected his backside with novocaine and when said sitter was completely anesthetized, he was carried aboard an airplane.

"The pilot took off and performed a number of slow rolls, loops and other aerobatics. As the doctor sat on his frozen fanny and was rolled around the sky, he discovered he had lost all ability to orient himself. Even though, in the course of other medical experiments, he had piled up many hours of aerobatic flying without undue discomfort, Doctor Strughold proved that when he lost his anchor of gravity-appreciation, i.e., the seat of his britches, the psychological effect produced was one of fear, nausea and absolute disorientation." — *Alaskan Air Command.*

CARBON MONOXIDE

In its publication "Safety Topics," ATU 307 cautions pilots:

If the canopy creeps open during dives, *do not* continue to make runs. Orbit the target and down that aircraft as soon as you land. . . .

If you have carbon monoxide symptoms and go on oxygen . . . breathe naturally. If you go to the opposite extreme you may become hyperventilated.

If you fly an AD-1 or -2 aircraft you should have an A-14 mask and if you're flying an AD-3, 4, 4N, or 4NA you should have A-13-A mask."

FOREWARNED IS FOUR-LIMBED

An F4D-1 crash, in which the pilot received a compressed fracture of a vertebra, prompted this comment from the flight surgeon:

"Whenever time permits, attention should be given by the pilot to positioning before ejection. It is surprising in this case that the injury to the vertebral column was so "slight," since in the design of the seat, the pilot normally slouches somewhat to reach the rudder pedals.

"Also, since the feet are in wells, covered in part by the instrument panel it would appear to be imperative to make at least some effort to pull in the feet prior to ejection."

PRE-PLANNED DECISIONS

This F2H-4 pilot had a flameout at the beginning of his flight, restarted, and almost reached his destination. There he reported at 12,000 feet with no power, and his only functioning instrument the turn-and-bank indicator. He proceeded in on GCA but crashed 2 miles from the field, receiving fatal injuries. Cause: flameout due to fuel exhaustion.

The flight surgeon noted that in view of the previous flameout, the borderline fuel supply, the adverse weather conditions and necessary altitude at the beginning of the penetration plus loss of instruments in descent, it is felt that the pilot lost his life by failure to eject at altitude. A well-defined, frequently repeated and again repeated ejection policy could have been the most important factor in saving this young pilot's life.

AIRCRAFT FLIGA REPORT
OPNAV FORM 3750-10 (11-55)

See Instructions for Completion Prior to Filling Out

AIR MAIL
(Outside radius 250 Mi. of NORVA)
OpNav Report 3750-10

TYPE REPORT ☐ FORCED LANDING ☐ INCIDENT ☐ GROUND ACCIDENT

1. Reporting Custodian
2. Date of occurrence (Local zone)
3. FLIGA Serial No.
4. TO: CHIEF OF NAVAL OPERATIONS (Op-57)
5. Model of aircraft
6. Bu. No.
7. Kind of flight
8. VIA: (1)
(2)
(3)
(4)
(Last) Director. U. S. Naval Aviation Safety Center
9. Model of other aircraft involved
10. Bureau No. of other aircraft
11. Location of occurrence
12. TYPE CLEARANCE ☐ IFR ☐ VFR ☐ LOCAL — From — To
13. Describe in detail the occurrence or maneuver involved
14. Describe causes of occurrence and any corrective action taken by reporting custodian

FLIGA'S

13 Pilot in FJ-3D experienced complete loss of hydraulic pressure in the utility system while on a routine training flight. He returned to the air station and lowered his landing gear by using the emergency system. Then a normal landing was made on runway 27 engaging the emergency arresting gear without damage to the aircraft or injury to personnel.
14 The plane captain failed to properly secure utility hydraulic reservoir cap. The loose reservoir cap caused a complete loss of hydraulic fluid.

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13 Line crewman, designated a taxi pilot, taxied T-28 aircraft off taxiway onto soft dirt. The nosewheel sank sufficiently into the dirt to allow the propeller tips to strike the ground.
14 Taxi pilot was taxiing from taxiway onto a hardstand which is used for full power turnup and defueling. He overshot the hardstand causing the nosewheel to sink into the soft dirt.

All aircraft being placed on the hardstand will be towed into position in the future.

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13 The ejection seat of FJ-3 was being removed from the plane for routine maintenance. The auto seat belt actuating cable lodged on some object in the cockpit causing the auto seat belt to fire. Maintenance man received burns about the face from the blast.

After disconnecting terminal AN-667-3 from angle in cockpit, fork RA-2500-3 is safety-wired to actuator prior to removal of seat from aircraft.

---

13 Driver of a forklift approached JD-1 from aft the port wing to move a wing jack stationed below it. When he saw that there was not sufficient clearance to use the fork lift to move the jack, the driver backed down and then turned port to clear the area. The driver did not turn enough to clear the wing and consequently the fork lift mast struck the port aileron as the vehicle moved forward.
14 Negligence on the part of the fork lift driver was the cause of this incident. The area was unrestricted. An active ground safety program is in effect. The necessity for observing sound ground safety practices was re-emphasized.

13 While accelerating an FJ-4 to climb schedule, shortly after takeoff, the left inverter access door separated from the aircraft.
14 Plane Captain followed immediately behind the pilot, securing those access doors left open for the preflight inspection. The left inverter access area is one of the last inspections conducted by the pilot prior to entry into the cockpit. As the pilot entered the cockpit, he observed the plane captain securing the door, and when the plane captain left the door area to perform other duties, the pilot assumed that the inverter access door had been fully secured.

The plane captain had failed to fully secure the door prior to flight.

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13 An SNB was parked on the front line heading into the wind, with a single metal chock in front of the port wheel, none at all used on the starboard wheel. The parking brakes were left ON. Some time later, the aircraft rolled back to the second line, striking another SNB.
14 Improper securing of parked aircraft, in that only one chock was used in relatively high wind conditions with no tie down.

Continued instruction of line personnel in proper aircraft securing technique; manufacture of additional chocks; more frequent inspection of parking ramp by Unit Duty Officers are corrective action to be taken.

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13 An NC-5 driver was maneuvering his vehicle between two closely parked aircraft when his foot slipped off the clutch and the NC-5 lunged backward into the port wing root of the F9F-8.
14 The need for constant vigilance on the part of all line handling crews has been and will continually be reemphasized.

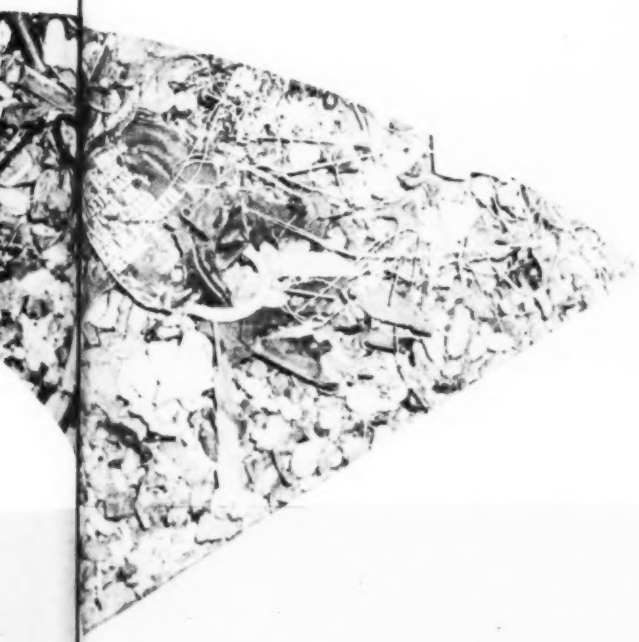
---

13 Towing an S2F-1 from hangar to parking area on fingertip taxiway 100′ wide, tractor operator attempted to tow aircraft between two parked aircraft involving two 90-degree turns. Second turn was not sharp enough and port main mount dropped off taxiway into mud.
14 Poor choice in route of ingress to parking area. No wing walker on port side of aircraft.

Corrective action: continuing vigorous education program for flight line personnel.

JETSAM!

. . . feed not into the engine items which are difficult to convert into forward thrust.—(ancient aviation safety proverb)



NOT LONG ago ComFAirAlameda reported the following observations: "The continued frequency of foreign object damage in gas turbine engines, particularly with axial flow—such as the J65, is resulting in an excessive number of premature removals.

"In most instances these failures can be attributed-to objects such as nuts, bolts, washers, safety wire and other debris left on taxi lanes, turnup areas, air intake ducts and fuselage engine bays.

"It is essential that stringent measures be adopted to: indoctrinate personnel on the importance of necessity of cleanliness in these areas . . . increase the scope and effort to effect adequate policing of taxi lanes/runways . . . enforce preflight procedures involving thorough inspection of air intake ducts and post-maintenance vacuum cleaning of inner fuselage and other airframe areas susceptible to accumulation of foreign objects."

The Training Command, in a related report, added that there is also the ever-present danger involved of broken pieces of turbine blades exiting through the side of the fuselage in the tailpipe area where control cables are liable to be cut and aluminum structural members damaged, or the airframe weakened by hot exhaust gases emitting from the hole.

Supporting this due concern for foreign-object-damage engine failures are BuAer's Disassembly and Inspection Reports (DIR). During the year 1955, 22.5 percent of all jet engines overhauled received foreign object damage.

An increase was noted for the 9-month period from 1 January through 30 September

Continued next page

JETSAM!

Continued

1956, when, of 511 jet engines overhauled, 131 or slightly over 25 percent were damaged by foreign objects (J65W4 engines in FJ-3, -4 model aircraft experienced a 26 percent damage rate).

In case you are wondering how other engines ranked statistically, here are a few of the going rates:

The J33-20 engine in TV-2 aircraft had the highest damage rate with 42.7 percent; the J48-P8 in F9F-6, -6P, 16 percent; the J34WE-36 in F2H-2, -3, 4s and in a few F3D-1s, 18 percent. The J47-GE-2 in *Fury* 2s engine ran second high with 37 percent.

Noting a long history of over 20 percent jet engine attrition to foreign objects, BuAer considers the clearing of runways, taxiways and runup areas of foreign objects a problem of top priority, stating that a "maximum of coordinated effort should be applied to a Navy-wide cleanup campaign."

BuAer also noted that while all naval air activities have been provided with rotary broom sweepers and magnetic sweepers for cleanup operations, it is aware that this equipment is not completely adequate.

Shoulder-to-shoulder pickup netted this result after a magnetic and broom sweep.

Consequently, BuAer, along with the Air Force, is evaluating power vacuum cleaners of the type illustrated in Figure 1. When a suitable airfield cleaner has been determined, BuAer says action will be initiated to obtain the approved type cleaner for naval air activities.

In the meantime, BuAer says it believes good results can be accomplished by a rigidly supervised and continuing cleanup program. Note, in the photo here, debris resulting from shoulder-to-shoulder pickup *after magnetic broom sweep operations.*

Foreign objects are frequently left adrift in airframes. These, too, find their way into turbines, control cable mechanism and have

Here's one of several makes of the runway vacuum cleaners being evaluated by BuAer and the Air Force.

short-circuited electrical terminals; cockpit crud has gotten into pilot's eyes. One West Coast outfit reported that it has practically eliminated foreign-object damage to engines by cleaning out dirt, wire clippings, washers and similar items which accumulate in the engine compartment. (*See Bill Pilcher's letter, Page 2*). The illustration on this page shows reverse air flow in FJ model aircraft during engine operation on the ground. Other jets also employ reverse air flow design.

To clean hard-to-get-at places the O&R at Norfolk has devised a vacuum cleaner operated with compressed air.

Called the "bazooka," this handy gadget becomes particularly versatile with the attachment of a length of flexible rubber hose, such as a surveyed oxygen breather hose, to its intake (suction) end. Small enough to fit into the average hand toolbox, the bazooka is useful in cleaning cockpits, and removing filings, rivets and other foreign matter left in airframes after service changes. It is sturdy enough to take considerable abuse, the bazooka can be manufactured with materials and equipment on hand in almost any squadron. Detailed drawings and specifications of the bazooka, provided by the Norfolk O&R, are shown on the next page.

On record are a few other causes of foreign object damage. In the poor maintenance practices department: A *Banshee* engine was damaged when the port generator blast tube cover was sucked into the compressor section at high RPM. A mechanic had neglected to remove the blast tube cover during preflight prior to start.

A *Cutlass* was turning up at 100% rpm for a tailpipe temperature check when an AM2 investigating a hydraulic leak passed directly under the intake, about 20 inches below. His hat was drawn into the compressor.

Another *Cutlass* was put out of commission when a starter-generator Marman locking clamp was not tightened sufficiently. It became disconnected and dropped into the engine. A *Fury Three*'s starter-generator bolt snapped and was drawn into the engine intake during mirror landing practice. Apply proper torque values and double-check those starter-generator fittings for proper security after doing any work on starters.

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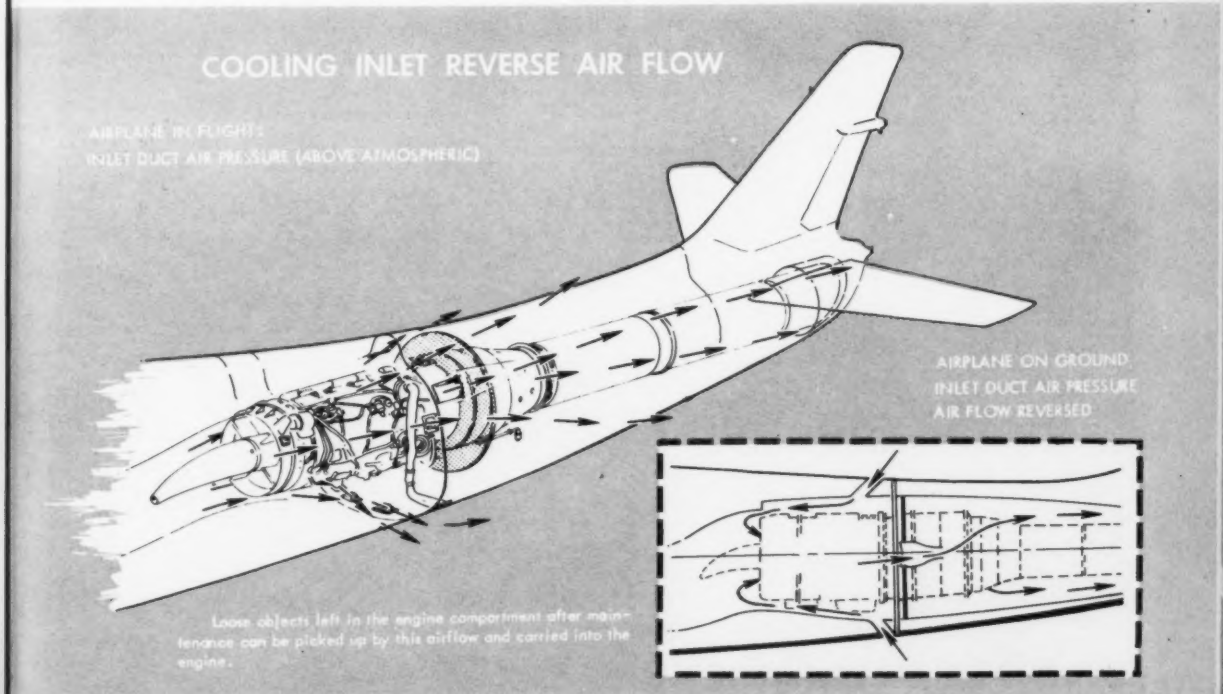
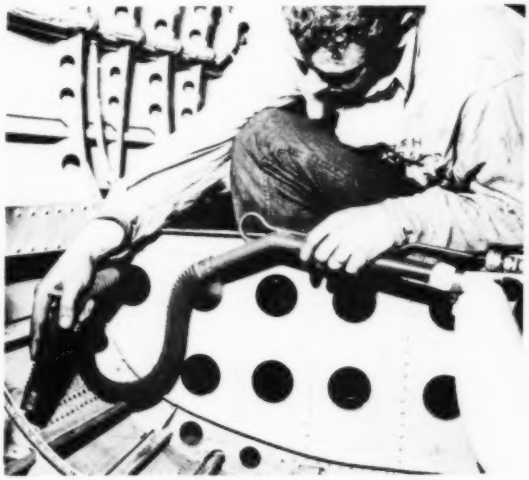


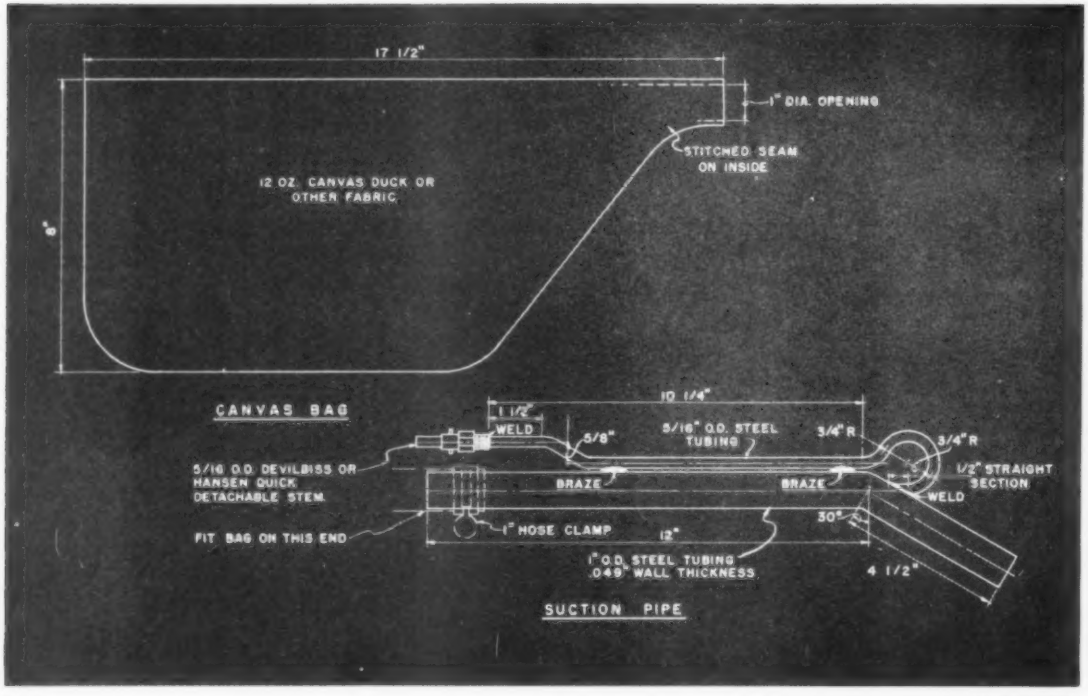
JETSAM!

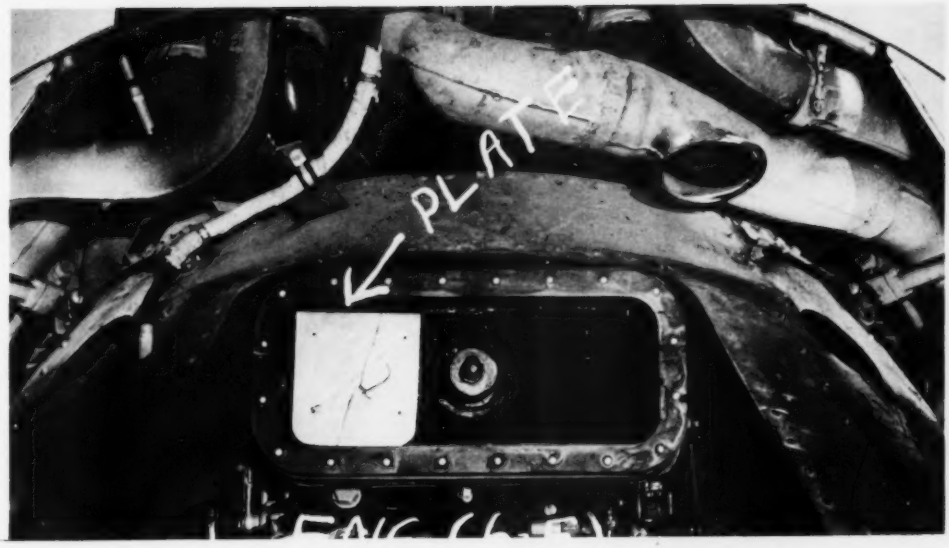
Continued

Mechanics find the homemade compressed-air-operated vacuum cleaner handy for cleanup after-service-changes.



Here are specifications for manufacturing your own "Bazooka." The tool has been in use by the O & R at Norfolk since 1949.





This metal plate, choked an AD engine to "death," and a major accident resulted.

And in the "little-you-can-do-about-it department" there's the inevitable case of birds getting sucked into air intake ducts of both jets and reciprocators. (One safety officer, troubled with flocks of seagulls on runways, is considering broadcasting of tape-recorded seagulls "distress" calls during flight operations.)

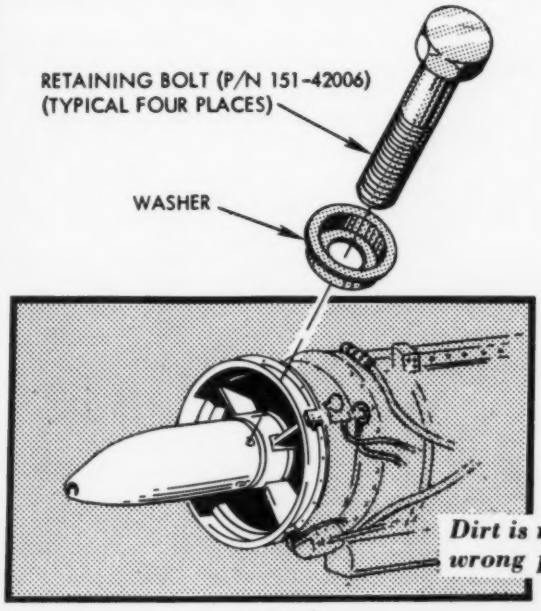
Yes, reciprocators are vulnerable to trash on air stations, too. An SNJ had a complete engine failure during takeoff—a 5" x 8" card blocked the air intake screen at the carburetor. A similar situation occurred to an AD—the photo on this page is self-explanatory.

Not all foreign objects are due to the mechanic's carelessness. As the photo on page 38 shows, a lot of other people can be responsible, too.

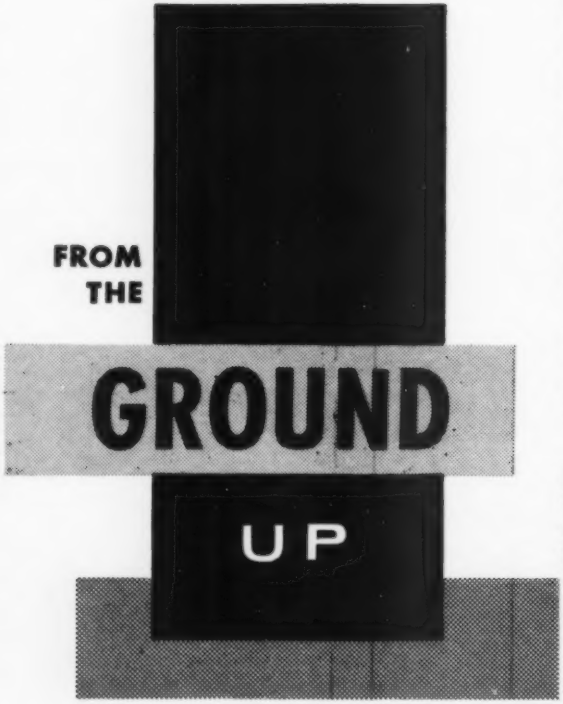
In this jet business, one command points out, cleanliness is more than a virtue—it is a necessity and *everyone* should appoint himself a cleanliness warden right now. So, every time you see something on the ground wherever jets operate, don't just look at it—*pick it up*

For more on foreign objects refer "Jet Engine Enemy No. I," Feb. 1956 Approach.—*Ed.* ●

Overtorquing of starter generator cover bolt in an FJ broke the washer. It was sucked into the engine causing damage requiring engine replacement.



***Dirt is not dirt, but only something in the wrong place.*—Lord Palmerston**



Notes and Comments on Maintenance

PROPER PETROL PLEASE—A recent T2V-1 aircraft accident investigation indicated that the use of AvGas in J33-A-24 engine caused combustion instability. This condition was confirmed by independent tests conducted on F9F-7 aircraft with J33-A-16A engines. Use of AvGas in some J33 engines appears to cause an excessively rich mixture resulting in RPM stagnation between 40 and 60 percent. BuAer recommends that only JP-4 fuel be used in J33-A-16/16A/24 engines.

ORDNANCE READY TO BLOW—Upon removal of the War Load of a MAG-11 FJ-2 aircraft, an inspection recently revealed several startling facts.

The Mark (5) Mod O 20mm HEI (high explosive incendiary) ammunition had evidently remained in the aircraft for a considerable period of time, during which the aircraft had flown many hops without the ammunition in the cans being checked. Apparently because of continuous acceleration and deceleration or because of braking action on landing, the belted ammunition was shifted forward and aft in the ammunition cans.

This jarring action caused the collapsible nose fuse cover on the Mk 5 Mod O HEI to crush down on the fuse firing pin. On one shell, the cover was partially torn away. In this condition, static electricity, a slight jar, or nearly anything could have fired it.

This condition is extremely hazardous to all personnel working on or flying the aircraft in as much as this shell is lethal within a radius of 10 yards. Precautions are in order until a fix is made.

DON'T DESTROY EVIDENCE—BuAer has noted that during the investigation of a recent accident, there was occasion to suspect a circuit breaker. In an attempt to make an internal examination, the breaker was destroyed thus preventing its being checked for calibration under controlled test conditions.

It is suggested that in cases where equipment failure is suspected, the investigation be made in such manner that functional checks to specification requirements prior to disassembly be performed, if advisable.

When the necessary test facility is not available, (such as an O&R) the equipment should be held for instructions from BuAer for shipping to a laboratory or manufacturer.

A HINT FOR CRASH CREWS—Recently, due to material failure, the nose gear of an F3D collapsed during landing roll-out. Unfortunately this happened at dusk just as several F9Fs entered the pattern low on fuel. Not having the proper slings and spreaders the crash crew hastily slung a cable beneath the F3D and raised it with a crane in order to gain access to the nose gear. Result. . . . Class "C" damage to the airframe as the cable cut through the fuselage in two places and badly wrinkled both engine cowlings . . . this in addition to the damage already sustained.

Had they only known! The weight of two or three men on the tail would have been sufficient to rock the nose upward and allow the nose wheel to extend.

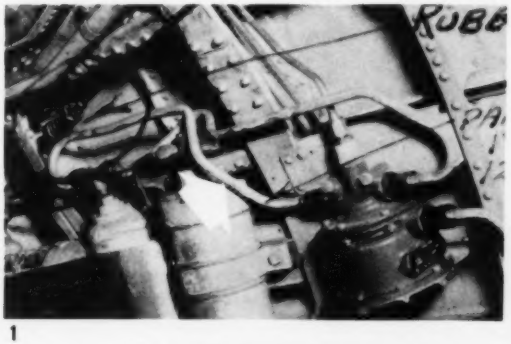
Admittedly, the crash crew cannot carry slings and spreaders for all types of aircraft with which they may deal nor can we expect that the nose gear will always be usable after collapse. However, if the crews would carry a dolly on which to rest the nose they could expedite clearing the runway (and prevent further damage to an aircraft) by using the "men on the tail" technique described above.

Many of our jets are adaptable to this system and most of our naval aircraft have tailhooks to which a tow line can be attached for emergency towing. There is nothing particularly new about this procedure but a reminder seems to be in order.

CONTAMINATED OIL COOLERS—A review of FURS and AmpFURS revealed instances of AD oil cooler failures caused by contamination due to engine internal failures. Metal particles were found in the oil coolers. The oil cooler must be replaced after an engine internal failure. The removed cooler should not be reissued unless it is cleaned properly.

MURPHY'S LAW

IF AN AIRCRAFT PART CAN BE INSTALLED INCORRECTLY, SOMEONE WILL INSTALL IT THAT WAY.



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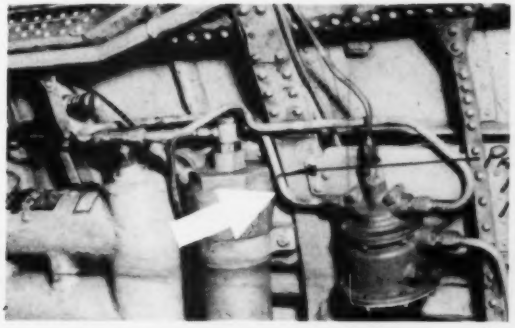

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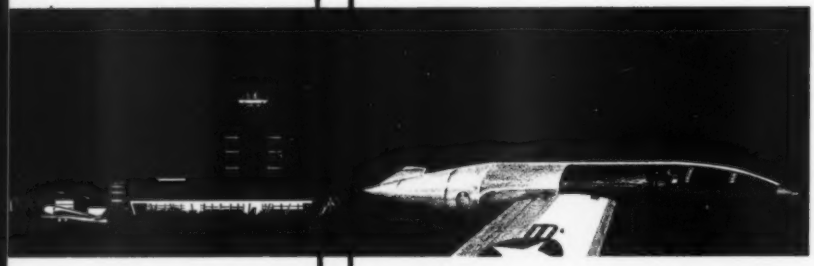
This "Murphy" pertains to F9F-6, -6P, -7 and -8 aircraft. A restriction of the elevator control cable on an F9F-6 aircraft occurred during preparation for flight. Investigation revealed the quick-disconnect, Part No. RA-2248-6 on the elevator down control cable rubbing and binding on an incorrectly installed plenum chamber hydraulic system pressurization line, Part No. 177500-1299-RP6. Refer to F9F Aircraft Service Change No. 336 page 13 for view of hydraulic line arrangement. Photo No. 1 shows the line incorrectly installed. Photo No. 2 shows the line correctly installed.

TIP TANK



Miscellaneous aviation safety information

FIRE WARNING CAUTION

The 2nd Marine Air Wing Safety Council has brought out the dangers of an inadequate or inaccurate warning of vapor, smoke or fire in flight.

One example mentioned a pilot who was told he was on fire following a strafing run. He acknowledged the warning and abandoned the aircraft, but at an altitude insufficient to permit the deployment of his parachute.

Conclusive evidence that the aircraft was actually on fire was not positively confirmed. Witnesses indicate that the smoke seen shortly after the recovery was commenced, ceased and was not seen again until after the aircraft crashed.

In another case, the pilot was told he was on fire. He left the formation and without following any approved emergency procedures, raced for a landing. Due to the long runway length at the field where he landed, and the fact that no fire existed, an accident was avoided. This pilot did not have a fire warning light, nor were the indications to other members of the flight such as to warrant a warning of fire.

Any warning as to fire in flight must be carefully weighed if it is to serve its intended purpose. It must be timely, but the accuracy of the warning must not be sacrificed for the sake of speed.

First and foremost, says the safety council, decide what you see and how best to describe it to the pilot you believe to be on fire. Second, give your warning in such a manner as to avoid creating a false picture in the pilot's mind. Third, continue to feed information to the pilot as it is available, and make it factual.

COFFEE BREAK

On occasion, "Flight Safety Foundation Bulletins" indicate cockpit inspection have disclosed "front offices" about as littered as the bleachers after a ball game—papers, gum wrappers, et al, not to mention control assemblies doused with coffee (with or without cream and sugar). For example, sooner or later coffee will cause solenoid points of a prop control assembly to arc.

On several occasions, pilots have reported nuts, bolts, washers and even wrenches loose in the cockpit. A recent accident was caused by a bolt jamming the flight controls.

Inspectors, of course, should be very critical of the conditions of an airplane, including the cleanliness of the cockpit. But pilots should be critical too, and keep the coffee off the control pedestal. (*Please see "Bazooka" vacuum cleaner, page 36—Ed.*)

ILS TIPS AVAILABLE

The CAA's Airway Operations Training Series Bulletin, No. 1, concerning Instrument Landing Systems is a handy little pamphlet for VR pilots, or aviators who may have occasion to use the instrument landing system. It's well worth the 20 cents. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

GOOD MANNERS

On a simulated surveillance (PPI) approach to the Honolulu International airport a P2V pilot ignored instruction as issued, made a sharp turn and nearly collided with a commercial airliner on final approach. The pilot of the P2V did not acknowledge instructions given by the control tower; however, after the near-miss he advised he had heard all transmissions.

The tower is responsible for positive control of all traffic within the airport control zone. Pilots of naval aircraft utilizing any civil airport for practice approaches must request clearance from the appropriate radio facility and are obligated to comply with instructions.

Watch a future issue of *Approach* for an article by Wright engineer on "Maintaining the R3350"—Ed.

OLD PRO CLUB

Thomas A. GRAHAM, LT, USN

Aircraft: HTL-4, HU-1

While in a hover at 7 feet above a hard surfaced landing area, the cyclic stick was jerked from Lt. Graham's hand and displaced full forward and to the left. The HTL-4 pitched violently nose down. Demonstrating great skill, Lt. Graham managed to regain control after this and several more violent attitude changes, and landed the helicopter without damage. During dismantling and inspection, it was discovered that the rotor hub dynamic stop was not mounted perpendicular to the dynamic stop cable, causing a groove to be worn in the ball end of the cable and an abrasion on the cable which produced a 2 to 1 beat in the rotor system.

George R. RUPP, Major, USMC

Aircraft: AD-4B, VMA-251

A partial engine failure which caused extreme engine vibration occurred to Major Rupp while on a night navigation flight over mountainous terrain of southern Japan. He had been flying at 9000 feet over broken clouds, and immediately set up a glide at his best speed, turned on his emergency IFF, contacted the GCI station for steers to a nearby Air Force base, and put the prop control in full high pitch to decrease drag. Descending through a hole in the clouds, he observed another Air Force base closer to his present position. He established a high altitude approach to the lighted runway, lowered gear and full flaps, and put the AD-4B into a slip to the runway. The engine froze completely on final approach, but Major Rupp landed successfully without further damage to the aircraft.

Clifford E. REESE, Ist LT, USMC

Aircraft: F9F-8B, VMF-114

At 20,000 feet and approximately 20 miles from the field, Lt. Reese experienced flameout during a section tactics flight. He headed for the field, making two unsuccessful airstart attempts en route, and entered a flameout pattern. Neither he nor his flight leader could obtain acknowledgment from the tower that the flameout was cleared to the duty runway. Lt. Reese planned to touch down about 2500 feet down the runway, but observing FLCP in progress, he altered his approach to land as near as possible to the end of the runway. At the time of this action, Lt. Reese had accumulated 372.6 hours of flight time, with only 14.3 hours in the F9F-8B.

Recognition of heads-up flying is essential to a positive program of flight safety. Each month, Approach will acknowledge certain selected individuals whose exhibited flying ability merits membership. Old Pro's also receive a wallet membership card as a memento of the occasion. Commanding officers are invited to submit nominations for selection.

(Left to right) Lt. L. Caulkett, USNR-R; Comdr. W. H. Alford, USNR; Capt. W. E. Fowler, USNR-R; Comdr. J. M. Tully, Jr., USN

VF-861

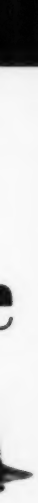
Naval Air Reserve Fighter Squadron 861 qualified for a "Well Done" by its unique accomplishment of checking out 22 pilots in air-to-air refueling in a one-day operation on 5 January 1957.

In the course of a regular weekend drill period, as a result of considerable advance planning and coordination with regular units, VF 861 flew its *Banshees* to NAS, Sanford, Florida on the evening of 4 January. The flight was made under actual night instrument conditions.

The next day, with the tanker planes being flown by Heavy Attack Squadron 5 of HAT-Wing 1, the reserve pilots demonstrated their competence in the techniques and application of air-to-air refueling.

Personnel of VF 861 were provided logistical support by FASRon 51 and NAS Sanford personnel who worked right through the weekend.

VF 861 is one of the nine air reserve squadrons which drill at NARTU Norfolk. It is commanded by Comdr. W. H. Alford, USNR.



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